

## Editorial

Beatrix Potter is probably best known to the world at large for her beautifully illustrated children's books. In this issue of *The Linnean* we examine her contribution to natural history.

When W. Phillip Findlay wrote *Wayside and Woodland Fungi* in 1967 he illustrated it with 59 paintings by Beatrix Potter, commenting:

“But Beatrix Potter was more than an enthusiastic amateur collector and artist. She had the mind of a professional scientist and biologist – which is what she undoubtedly would have been had she lived in a later age; unless she had taken up archaeology in which she also took a very keen interest”.

Further research has shown that Beatrix not only made accurate documentation of all the fungi she illustrated, but that she also carried out pioneer studies on germination of fungal and lichen spores, the role of algae in the lichenized fungi and the asexual stages in the life cycle of macromycetes. The legacy of her contributions to mycology is to be found in the folios of illustrations deposited in the Armitt Trust, Ambleside, the Perth Museum, and in the Victoria and Albert Museum.

We in the Linnean Society, however, were already aware of her contribution to mycology through her paper presented in April 1897 entitled “Germination of the spores of the Agaricineae” which although well received at the time was returned to her for modification. Sadly it was never resubmitted.

Although Findlay suggested that Beatrix Potter might have taken up archaeology it is now clear that she was far more interested in palaeontology. Moreover the accurate and detailed documentation of her fossils shows that she enjoyed collecting them every bit as much as her fungi.

Fossils provided an extra dimension to her scientific studies and she used the facilities of the nearby Natural History Museum for their identification. She also collected and drew insects but, like her archaeological paintings, this appears to have been a more recreational or artistic pursuit rather than a serious scientific study.

This issue also contains an account of John Lindley, founding father of orchid taxonomy, who not only saved Kew Gardens for the nation and brought about the repeal of the 1815 Corn Laws, but also founded and edited that most influential of horticultural journals: *Gardener's Chronicle*.

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## Society News

The most recent (1999) version of *The List* has had the beneficial effect of awakening some Fellows to the fact that their abode has changed. We are grateful for this information and we apologise to those who have been inadvertently omitted – please note, if your Contribution is overdue, you will not be on *The List* – or whose details have been wrongly attributed. Thanks, as ever, are due to Dr. Charles Goodhart FLS, who has gone through *The List* with valuable comments.

Within two years it is proposed to reissue *The List*, adding as many e-mail addresses

as we can. As part of a general refurbishment of the Society's www site, now some 3½ years old, it is also proposed to set up an e-mailing arrangement for Fellows to inform them of changes to the programme, special meetings, etc. This will, for those Fellows who have e-mail addresses, be used instead of (snail) mail delivery. The cost of postage is a very real one for the Society – it constitutes some 30% of the cost of journals for Members – and the use of e-mail for urgent announcements will enable us to cut back on our postage bill. We hope that Members will feel happy to cooperate in this. The system to be set up will allow Members to send their e-mail addresses for direct incorporation into the e-mailing list, without going through the office here. More on this in April.

The Societies at Burlington House have been made aware of plans for substantial repairs and improvements to the buildings and courtyard, which will take place in 2000. The appointment of new managing agents seems to herald a new and more positive era than hitherto, a statement which has been conveyed to Sir Roger Makins, Permanent Secretary of the DETR. The Courtyard Societies have agreed to a further halving of parking spaces under pressure from the DETR to ban it altogether, save for the disabled.

The proposals include repaving the courtyard by the Royal Academy, which it is aimed to carry out January – April 2000 (and with which the Societies are generally happy) and significant repairs and refurbishment of the upper reaches of the fabric of the entire building. **Members are asked to note that requests for parking space in the new millenium are unlikely to be met, given a prior need for deliveries and contractors' vehicles.**

As far as this Society is concerned, scaffolding will surround the upper reaches in the early part of 2000; a small "test" piece is in place now (September). The Society will be seeking to ensure that as the repaving is carried out, basement ventilation is re-established (it was lost after the last refurbishment in 1989/90) and disabled access to the Society is also considered (since one of the reasons for the repaving is to improve disabled access to the RA). New laws relating to disabled access will make this an imperative in the new millennium.

Efforts are currently being made to interdigitate the various activities through 2000 and to maintain security and safety. There will clearly be periods of inconvenience and the Societies have agreed to try to live with these, provided that they are notified well in advance of possible interference with normal activities. It could mean that we have to seek alternative venues for meetings but, providentially, there are no major ones planned by this Society in Burlington House early in 2000.

Finally, the second quadrennial architects' report on the state of New Burlington House has at last appeared (it was due early in 1998). It is an advisory document, but the Societies are urged to take account of its recommendations when embarking on any redecoration or restorative work. Some recommendations have already been carried out since the survey was conducted, e.g. stairwell redecoration and health and safety-related matters. A copy relating to the Linnean Society is in the Library.

Professor Jack Hawkes Hon FLS, Past-President, has been awarded the title of Professor Emeritus of the Vavilov Institute. The headquarters of the Institute are in St. Petersburg.

Amongst those Fellows who have died in the past few months, we need to note two

distinguished geneticists, Professor Arthur Cain FRS and Professor Guido Pontecorvo FRS FRSE (whose obituary appeared in the *Daily Telegraph* on 1st October). Most of Professor Pontecorvo's professional career was spent at Glasgow University; on retirement he took a post at the ICRF and was a regular attendee at Society meetings.

The Society acknowledges with gratitude a donation of £1000 from Mrs. Gertrude Mary Looi FLS and a bequest of £2000 under the will of the late Miss June Hildegard Franklyn Finch. Miss Finch lived in Petworth, West Sussex. Her solicitors have written that "Miss Finch was the last of her family so we are unable to pass on your thanks for the legacy which she left to the Society. When she made her Will she did tell the story of how she was walking through London one day. Apparently she saw your brass plate and decided that your Society sounded interesting. We cannot recall whether she actually visited the premises or just walked on by! Even if she was not a regular subscriber she was certainly aware of your work and wanted to support it. Although she had been a school mistress her subject was classics and divinity but she came from a family of enquiring minds."

The Dean and Chapter of Lincoln Cathedral have agreed to the Britain Australia Society in Lincolnshire putting up a plaque commemorating the contribution of Sir Joseph Banks to the life of Lincolnshire. The cost is estimated to be £5000, of which nearly £2000 has been raised. Any Members wishing to contribute should make cheques payable to the the Britain Australia Society Lincolnshire Banks Plaque and send them to The Secretary, The Subdeanery, Lincoln LN2 1PX.

Two meetings were organised in 1991 and 1994 by Professor Michael Claridge, Past-President of the Society and the Systematics Association, on *Taxonomy in the 1990's* and *Systematics Agenda 2000*. In May 1995, the Society, the Systematics Association and the European Science Foundation held a meeting in Leiden to consider *Systematics Agenda 2000: the challenge for Europe*. The Leiden meeting was organised by Professor Pieter Baas FLS and Dr. David Cutler FLS. In 1996 a book of the same title appeared edited by David and Professor Stephen Blackmore FLS. In 1997, after wide discussion, the Society put together two working groups, one on plants and the other on animals, to make proposals to the Framework 5 research programme of the European Community on furthering European taxonomy. The plant group, which came to be known as Euro+Med PlantBase (after an interlude when it was unfortunately known as the Sisyphus project), is chaired by Professor Benito Valdès FLS, of Seville; its secretary is Dr. Stephen Jury FLS of Reading. The EU has offered Ecu 1.2M to this project. The animal project, which is known as Fauna Europaea, is chaired by Dr. Wouter Los FLS, of Amsterdam and its secretary is Dr. Daniel Goujet FLS, of Paris. It has been offered Ecu 2.97M. Congratulations go to all those European taxonomists, many of them Fellows of the Society, who have toiled over three years on these proposals, to all those who made funds and hospitality available for meetings, and to the Flora Europaea Trust, which significantly funded the deliberations of the Euro+Med PlantBase; the Society's general funds supported the Fauna Europaea. In total the sums indicated by the EU are £3M; the inputs from the Society and the Flora Europaea Trust were just short of £30K.

It was good to receive the first feedback and good wishes to the Society for this success from Professor Alessandro Minelli FLS, of Padova, Italy, who played a

significant role in setting up the framework for the proposals. Shortly thereafter, he suffered a heart attack, from which he is still recovering. We wish him well.

The British Association for the Advancement of Science meeting in Sheffield in September had one virtue – the organisation was smooth and effective and those assisting from the University were most helpful. That said, our three speakers lectured on *Wood for the people: modern research on old problems* to a virtually empty hall, whilst people were fighting to get in next door to hear about the sex life of dinosaurs. Next year's meeting is closer to home in South Kensington. The Albert Hall is to be used. The Hall was originally built for the Victorians' promotion of science and technology, but few scientific organisations can afford to use it now.

With a proposal to mark 50 years of DNA in 2003 maybe we were too far ahead. There now seems to be some support for a meeting marking the occasion, in which a considerable number of biological societies might indicate how knowledge of DNA has affected a particular speciality. For us, a more significant event may be the 2007 tercentenary of the birth of Linnaeus, which our Swedish colleagues are already planning.

Efforts so far along the road of better public understanding of biological matters tend to end up by preaching to the converted. In the last 10 years, media interest in our programmes has concentrated on Beatrix Potter (who was to have presented a paper on fungi here in 1897) and Piltown Man. A depressing scene, it might be said, but one which has to be faced. Clearly we will not always find a suitable icon to attract public attention to our meetings, but there is no harm in trying. That said, the joint one-day meeting with the British Ecological Society in October organised by Professor Berry – *Biodiversity: is it worth more than money?* – attracted over 90 participants; by keeping the very distinguished speakers to 15 minutes apiece, a lively discussion ensued and both the BES and ourselves are encouraged. We are hoping to put together a further meeting early in May 2000 under the title *Managing the countryside – too many laws?*

Members are asked to note that 4–8th April 2000 mark an international conference titled *Nature's Treasurehouses?* on the role of natural history museums and collections. Further details from the Conference Coordinator, Science Directorate, The Natural History Museum, Cromwell Road, London SW7 5BD, [conference@nhm.ac.uk](mailto:conference@nhm.ac.uk) or [www.nhm.ac.uk/conference](http://www.nhm.ac.uk/conference).

The Field Studies Council's AIDGAP publications which the Society has supported to a total of £9000 over the past four years are considered amongst the best of their kind – economical, attractive booklets and cards to help in identification of species. The Council has agreed that up to £3000 be allocated to the FSC for this project in 1999.

The Council further agreed to loan to the Sydney Botanic Garden, to mark the Olympic Games in Australia in 2000, a botanical specimen from the waratah plant (*Embothrium/ Telopea speciosissima*), which is in the Society's collections. It is believed to be the first specimen of this plant, now the national symbol of NSW, to arrive in Europe. It was collected by John White in the 1790s. It was described by the Society's founder, Sir James Edward Smith (1759–1838), in whose collection it first resided, as "the most magnificent plant which the prolific soil of New Holland affords".

JOHN MARSDEN

## Notice

The Trustees of the Linnean Society of London hereby give notice that they have passed a resolution under section 74(2)(c) of the Charities Act 1993 for the following purposes:

That the trusts of the Westwood, Omer-Cooper and Bonhote Funds should be modified by replacing the current purposes:

1. *to pay for the illustrations of papers dealing with Arthropoda in the Society's publications (Westwood)*
2. *for the purchase of books relating to water beetles and isopods (and/or related Crustacea) for the Library (Omer-Cooper)*
3. *to subsidise the preparation and publication of monographs or other suitable works on water beetles and isopods (and/or related Crustacea) (Omer-Cooper)*
4. *to assist in the financing of symposia concerned with water beetles and isopods (and/or related Crustacea) (Omer-Cooper)*
5. *to provide grants to British-born subjects towards the cost of projects related to the furthering the knowledge of heredity (Bonhote)*

with the following purpose: *research in systematic biology.*

Any interested person wishing to make representations regarding this said Resolution may do so, quoting the Charity Reference No. 220509, within a period of 6 weeks from the date of this notice, by writing to the Charity Commissioners for England and Wales at Harmsworth House, 13–15 Bouverie Street, London EC4Y 8DP.

Signed by Sir Ghilleen Prance FLS FRS,  
President of the Linnean Society of London, on behalf of the Trustees.

## Background to the above notice

The Linnean Society currently administers 18 special funds, which are treated in the Society's accounts as Endowments and Restricted Funds. These are used to sponsor prizes, special lectures, medals and fellowships. The Society also supports research proposals, predominantly in systematic biology, which it has done hitherto under the aegis of the AG Side Fund, which the Council has supplemented with general funds for this purpose. The Council (the elected members of which are the Trustees of the charity) has endorsed a call from the Grants Committee to seek guidance from the Charity Commissioners about changing the conditions of use of some of the Society's funds. For publicly available grants, one way to do this is to consolidate four of the grants into systematic biology, which the Society is good at handling.

The Society's Council is seeking to merge the AG Side Fund with three others, the Westwood, Bonhote and Omer-Cooper Funds. Together these funds totalled £118 441 at the end of 1998. Those Fellows of the Society responsible for allocating the Society's grants wish to see all applications for research money including publication treated in the same way by the same group of people. It may also resolve the problem of what to do with relatively small sums of money which the Society receives from time to time usually in recognition of a late Fellow, which can be consolidated into the AG Side Fund.

The following details applications (successful ones in brackets) to the various funds over the last five years:

	Bonhote	Omer-Cooper	Westwood†	Side
1994	3 (2)	0	0	n/a
1995	2 (1)	1 (0)	0	17 (3)
1996	2 (1)	1 (0)	0	41 (12)
1997	0	1 (1)	0	17 (4)
1998	1 (1)	1 (1)	0	9 (4)
1999	0	0	0	13 (12)

† only a single disbursement has been made from this Fund in the last ten years.

From these figures, it can be seen that the more broadly based remit of the AG Side Fund encourages applicants, generating the greatest pressure on this Fund.

- (1) The Westwood Fund (set up in 1894) can only be used to pay for illustrations in papers on arthropods (Crustacea) in the Society's own journals. High quality photographs have largely replaced line drawings, hence the lack of applicants. The Trustees would like to use this Fund on the same terms as the AG Side Fund. Its income in 1998 was £256
- (2) The Bonhote Fund (1975) embraces a very broad field "furthering the knowledge of heredity", which is now very different in complexion and resource requirements to the conditions prevailing when the Fund was set up in 1975, including e.g. molecular genetics. Such work is becoming an established feature of systematic biology (as recent publications on plant taxonomy from the Royal Botanic Gardens, Kew have dramatically shown). The Bonhote Fund's income in 1998 was £802
- (3) The Omer-Cooper Fund (1976) focuses on woodlice and water beetles. It provides *inter alia* for the publication and provision of books on these topics for the Library. It has to be said that there are few of these (the Society itself publishes most of them through the Field Studies Council in its series *The Synopses of British Fauna*). The successful applications over the past few years have enabled a group of water beetle enthusiasts to hold a small annual gathering somewhere in Europe, which does not consume much of the interest in the Fund and may be inappropriate. Again the Trustees request to be allowed to apply the same general terms as the Westwood and Bonhote Funds. Because this fund has an income in excess of £1000 pa, it must be retained as a separate fund, but the trustees are recommending that its purposes are the same as that of the AG Side Fund. Its income in 1998 was £1917.
- (4) The AG Side Fund was set up relatively recently (1991) by the Society's Council, following a bequest under the will of Mrs. Side. Its purpose is broadly drawn to support research in systematic biology and this is seen as the most helpful way to use all these Funds. Its income in 1998 was £2143.

The Trustees feel that differing standards apply to disbursements from each of these Funds, because the purposes for which these funds were set up many years ago do not generally match current scientific priorities or scientists. It also seems to them perverse to turn down applications to one fund for lack of income, whilst another fund remains unused because no-one has applied to it. It would be appreciated if any Members writing to the Charity Commission on these matters provided the Society with copies of their letters.

JOHN MARSDEN, Secretary to the Trustees

## Picture Quiz

*John Lindley*

The October Quiz (15(4):11) featured John Lindley (1799–1865), botanist and horticulturist. He was born 5 February 1799 at Calton, near Norwich, being a descendant of a good Yorkshire family. His father, George Lindley, was a nurseryman of considerable ability and author of *A Guide to the Orchard and Kitchen Garden* (of which his son issued an edition in 1831 to help pay off his father's debts).

He received his initial education at Norwich Grammar School where he acquired a sound classical education while he learned French from a French refugee. He left school in 1815 and shortly afterwards went to Belgium where he worked as the representative of the well known seed merchant, Mr. Wrench of Camberwell. After a brief sojourn he returned to England where he assisted his father in running his large Calton nursery.

His first scientific acquaintance was with William Jackson Hooker (who had also been educated at Norwich Grammar School) 14 years older than himself who lived in Norwich and who was in the habit of visiting the nursery to procure plants and insects. This acquaintance continued after Hooker had moved to Halesworth. It was while visiting Hooker that Lindley translated the latter's copy of Louis-Claude Richard's *Démonstrations botaniques ou Analyses du Fruit considéré en général* (Paris, 1808). This he accomplished at a single sitting, having worked at it for three days and two nights without intermission. It was published in 1819 titled *Observations on the Structure of Fruits and seeds, comprising the Author's latest corrections; and illustrated with Plates and Original Notes* (London, John Harding; Norwich, Wilkin and Youngman). In spite of having lost the sight of one eye in childhood, Lindley was artistically gifted and able to portray plants accurately: the plates in this translation are engravings executed by Lindley himself.

In January 1819 Lindley left Norwich for London, having been introduced by Hooker to Sir Joseph Banks who employed him as an assistant librarian in his library in Soho Square. Here, he not only had access to the richest botanical library and herbarium in Britain, but also came under the tutelage of Robert Brown (1771–1858) Banks' librarian.

His first publication was on the Rosaceae. *Rosarum monographia; or a botanical history of roses* (1820) was dedicated to Charles Lyell senior. It so pleased Lyell that he sent him £100 with which to purchase a microscope and start an herbarium (see *The Linnean* 13(4): 6). His next was *Digitalium monographia* (1821) with 23 plates engraved by Ferdinand Bauer, five by Lindley. Visiting Hooker in Halesworth in 1820 he found some duckweed in flower which he described in Hooker's *Flora Scotica* (1821) (2 vols., vol. 2 the Phanerogamia being the joint work of Hooker and Lindley).

Lindley was elected a Fellow of the Linnean Society in 1820 and later that same year the Horticultural Society employed him to draw roses. Banks died 19 June 1820 and two years later Robert Brown leased to the Linnean Society the Soho half of Banks' house at an annual rent of £140 (see *The Linnean* 4(2): 25). In 1822 Lindley was appointed Assistant Secretary to the Garden of the Horticultural Society at Turnham Green, Chiswick (of which his friend Joseph Sabine was then Honorary Secretary).

The following year he married Sarah Freestone of Southelmham, Suffolk, with whom he had three children. They eventually moved into a large house (Bedford House) on Acton Green in which Lindley could keep both herbarium and library as well as an arboretum. His two daughters were also competent artists and assisted him in the illustration of some of his later works.

In 1826 he was made sole Assistant Secretary of the Horticultural Society and so became the mainstay of that Society. Eventually Sabine resigned (1830) and was replaced by Bentham who restored the Society to its former prosperity (see *The Linnean* 10(1) 8; 10(2) 79; 10(2) 11; 10(3) 14; also 5(2) 18–20) with the promotion of exhibitions in London and other parts of the country. When Bentham resigned in 1841 these duties were taken over by Lindley who with the title of Vice Secretary was already doing the whole work of the Society. He continued in this capacity until 1858, when he became both a member of Council and Honorary Secretary. When, in 1862, he was persuaded to take charge of the Colonial Department of the International Exhibition, he finally gave up office.

When the new Chair of Botany at the University of London was initially advertised in 1825, Lindley commented in a letter to Hooker:

“I fear they have made a mistake, that they have not determined to bribe able men for the Chairs that can scarcely be profitable from the classes”.

Lindley had realised that London University did not intend to pay its professors and that he would have to rely entirely on the subscriptions paid by the students attending his lectures.<sup>1</sup> Nevertheless, three years later (May 1828) he was appointed the first professor of Botany, a post he held until 1860 when he was made Emeritus Professor.

His inaugural lecture on 30 April 1829, although meant to advertise the ensuing course, clearly set out his views on both the subject of Botany and its utility in relation to medicine, horticulture and geology. The lecture is reprinted in Stearn (1999).

During his 30 years at University College he gave five lectures a week, 8–9am in the Spring Term and 6–7pm in the Autumn Term. In the early years he made the journey on horseback daily between his house at Acton Green and Gower Street.

In 1835 the Worshipful Society of Apothecaries elected Gilbert Burnett as its first Professor of Botany at the Physic Garden (later Chelsea Physic Garden). Unfortunately he died later that same year and was succeeded as Professor at the Garden by Lindley.

Lindley gave two lectures a week here during the summer for some 20 years (1835–1855) and as at Chiswick he had a considerable influence on the development of the Garden, rearranging all the plants according to his “Natural System”.

During his years in Office the cross fertilization between the University of London and the Physic Garden was probably at its greatest, with students from King’s and University College (these were the foundation Colleges of London University) attending his courses. London University (the examining University) had come into

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<sup>1</sup> See article on Lyell (*The Linnean* 13(4); 5) which deals with London University (later University College) as well as King’s College, and the history of Lindley’s appointment.



being (1836) within a year of his election but, because University College set such a high standard in medical education, the majority of medical students sought the softer options of the diploma awarded by the College of Surgeons or Society of Apothecaries. Thus in 1862, nine years after Lindley's services had been dispensed with by the Garden Committee due to financial difficulties, the 50 or so medical students who used the facilities of the Garden were still mostly of the diploma variety.<sup>1</sup>

The replacement of the Linnean System with the Natural System (both in the lecture room and in the Garden) meant that Lindley had to provide textbooks of his own. He had already published: *An Outline of the First Principles of Botany* in 1830 and *An Introduction to Botany* in 1832. In 1838, two years after his appointment to the Physic Garden, he published *Flora Medica*, a botanical account of all the more important plants used in medicine in different parts of the world.

It was during his early years as a lecturer that his fascination with orchids really began. He became friends with Franz Andreas Bauer (1758–1840), an artist resident at Kew who produced some of the finest illustrations of the structure of orchids ever made. Lindley subsequently provided the text for Bauer's book *Illustrations of Orchidaceous Plants* (1830–38). He also edited the *Botanical Register* from 1829 to 1847, in which he recorded many new orchids. At the same time, he produced *The Genera and Species of Orchidaceous Plants* (1830–1840).

These were by no means Lindley's only works of this period. In Loudon's *An Encyclopaedia of Plants* (1829) he was responsible for the entire text of 1,159 closely printed pages dealing with 14,649 species of flowering plants and ferns (illustrations by Sowerby), which according to Stearn (1999) stands comparison with Linnaeus' *Systema Vegetabilium* of 1774. He was also responsible for the botanical articles down to the letter R in *The Penny Cyclopaedia of the Society for the Diffusion of Useful Knowledge* (28 vols. 1833–43).

Wallace records (*My life*) borrowing a copy of Loudon from his bookseller (Mr Hayward) having previously bought a copy of *First Principles* for 10s. 6d. He then copied the characters of every British species from Loudon into Lindley's volume – either into the capacious margins or onto interleaved sheets – thereby providing himself with all the flowering plants and ferns as well as the genera of mosses and the main divisions of the lichens and fungi. He further records that it was Lindley's articles in the *Gardener's Chronicle* on displays of orchids at one of the London Flower Shows where he, Lindley was enumerating the species and remarked:

“*Dendrobium devonianum* too beautiful for a flower of earth”

together with other descriptions of orchids in the *Gardener's Chronicle* that:

“had its share in producing that longing for the tropics which a few years later was satisfied in the equatorial forests of the Amazon” (*My Life*: 195).

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1 In 1842 T.H. Huxley, as a result of attending Lindley's lecture programme at the Physic Garden, won the silver medal and on the strength of this was awarded a free scholarship to Charing Cross Hospital (Huxley's father had recently died and this scholarship was for students whose parents were unable to pay for their education).

The 1830s was a most fruitful period for Lindley. In collaboration with William Hutton he wrote the *Fossil Flora of Great Britain* (3 vols 1831–1857) with plates by William Williamson. He was responsible for the last three volumes of Sibthorp and Smith's *Flora Graeca* (1806–1840) which, according to Stearn, is the most costly and certainly one of the most beautiful of British botanical works. 1834 saw the publication of his *Ladies' Botany* written in the form of twenty-five letters and in 1837 he published *Victoria regia* in a folio work with a coloured plate, printed privately, limited to twenty-five copies.

Lindley's friend Joseph Paxton (1803–1865) was the first horticulturalist to get this giant water lily to flower in cultivation. Paxton had been a gardener at Chiswick during Lindley's time as garden secretary, but in 1826 (three years after he started at Chiswick) he became head gardener to the Duke of Devonshire at Chatsworth.

In 1841 Paxton and Lindley (plus two supporters) decided to supply a long-felt want in the shape of a first-class horticultural journal and accordingly founded *Gardeners' Chronicle*. Lindley was the editor, a position he held for nearly a quarter of a century, during which time he did his utmost to raise the status of horticulture.

Earlier in 1837 the Treasury, hoping to rid itself of the expense of maintaining Kew Gardens, appointed an expert committee to report on the issue. The three experts appointed were: John Lindley who was backed by the Horticultural Society and the Worshipful Society of Apothecaries; Joseph Paxton, backed by his employer, the Duke of Devonshire who was President of the Horticultural Society, and John Wilson head gardener to the Earl of Surrey (who by virtue of his office of Lord Steward had the control and management of Kew).

In the event Lindley produced a cogent report which, whilst revealing a certain amount of incompetence and extravagance on the part of the majority of Royal gardeners, recommended that Kew be:

“at once taken over for public purposes, gradually made worthy of the country and converted into a powerful means of promoting natural science.”

He further stressed that Kew should ultimately become the headquarters of botanical science for Britain, and its empire, with a herbarium and library.

Lindley's association with the Government continued with the onset of the potato famine of 1845, when he was commissioned by Robert Peel to visit Ireland together with Lyon Playfair (a chemist) and Robert Kane (an Irish scientist). Their subsequent report led to the repeal of the Corn Laws. During the whole sorry episode Lindley kept the public informed of the effect of *Phytophthora infestans* through his editorship of *Gardeners' Chronicle*. Lindley, together with Hooker, also advised the Government on the efficacy of the planting of Ascension Island with potatoes.

Lindley also fought a long and ultimately successful battle against the tax on glass through *Gardeners' Chronicle* which was eventually won in 1845 when the tax was repealed. The price of glass fell dramatically, bringing the ownership of glasshouses within the reach of the ordinary gardener.

Today we not only consider John Lindley to have been a pioneer orchidologist but more importantly to have been the founding father of orchid taxonomy. He was fortunate in his wife who maintained, curated and conserved his herbarium. This

herbarium, with its unrivalled collection of orchidaceous plants, was bought in 1864 (the year before he died) by the Royal Botanic Gardens, Kew and according to Cribb (in Stearn: 112) his collection of orchids is one of the most frequently visited parts of Kew's renowned Herbarium<sup>1</sup>.

### *Lindley and Darwin*

Lindley's association with Darwin seems to have started in 1841, from which date Darwin kept annotated copies of the *Gardeners' Chronicle* as well as issues of special interest to him in separate parcels. Correspondence between the two apparently commenced in April 1843 when Darwin forwarded some ancient seeds (sent to him by a Mr. Kemp) to Lindley for germination. In August 1843 he wrote to *Gardeners' Chronicle* on the origin of double flowers asking the Editor if they were sterile:

"is there any shadow of truth in the theory, or is it an abortive one, as are the buds of the *Gentiana*".

Lindley replied that the gentians were new to him:

"but your Scotch seed (Kemp's) proved *Rumex*, *Acetosella* and this *Atiplex* – what species I do not know" (4 Sept. 1843).

In 1845 *Gardeners' Chronicle* published some plant breeding experiments by Hervey involving cereals. In a letter to Hooker, Darwin commented:

"the change from wheat into rye is here wholly disbelieved".

But then he notes that:

"Lindley puts some faith in it". (Feb. 1845).

That Darwin assiduously read all his copies of *Gardeners' Chronicle* is clear from his correspondence. Thus in a letter to Lyell he remarked:

"I am sorry to see that Lindley abides by the carbonic-acid-gas theory. By the way I was much pleased by Lindley picking out my Extinction paragraphs and giving them uncurtailed: to my mind putting the *comparative* rarity of existing species in the same category with extinction has removed a great weight; although of course it does not explain anything, it shows that, until we can explain comparative rarity we ought not to feel any surprise at not explaining extinction - " (25 Aug. 1845)

Then two letters to Hooker (Jan. 1846) in which Darwin commented:

"what an odd chance it was the discussion in the *Gardeners' Chronicle* about the longevity of fruit trees (Lindley's article) – where it was claimed they may live for ever — it is contrary to all analogy in the Veg. Kingdom, why do not herbs do so – no doubt it is very rare with trees as it is with us, to die of *sheer old* age; there is generally an immediate cause".

As Editor of *Gardeners' Chronicle*, Lindley reviewed all the new books, and

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<sup>1</sup> Lindley's orchids were separated from the rest of his herbarium which was eventually sold to Cambridge University.

important publications such as the *Proceedings of the Linnean Society*. Consequently in 1845 he reviewed Darwin's *Journal of researches* causing Darwin to comment in a letter to Hooker:

"It was gratified by sending two *most* favourable notices and an extract in the *Gardeners' Chronicle* evidently by Lindley, with whom I am not acquainted except by correspondence."

Unfortunately much of the correspondence between Lindley and Darwin no longer exists and again we can only get glimpses of it in Darwin's correspondence with friends. Thus in a letter to William Fox (Feb 6, 1849) Darwin tells him that he had been recommended to tie up his fruit trees like besoms but that he had written to the *Gardeners' Chronicle* and Lindley had advised him:

"Cut loose at once or you will spoil your trees".

From 1850 onwards Darwin found *Gardeners' Chronicle* increasingly interesting. The sexual structure of ferns:

"hybridising is possible said Lindley" (see *Gardeners' Chronicle* Aug. 1853).

"*Aegilops* (a genus of wild grass) in Lindley's garden is identical to appearance with wheat perhaps an ancestor of *Triticum* (25 Aug. 1854)".

In March and July of 1853 Darwin wrote to *Gardeners' Chronicle* about nectar secretion in plants. Finally in August 1855 Lindley invited Darwin to visit him in Chiswick. Unfortunately in the event Darwin felt too unwell, although, after several other attempts they finally met on 29 November 1855 through the efforts of their mutual friend Hooker. Earlier that same month Lindley had reviewed Hooker's *Flora Indica* which had caused Darwin to write to Hooker:

"how capitally your *Flora Indica* is noticed in the last *Gardeners Chronicle* – Lindley and Berkeley seem to go the whole hog in cutting down species" (6 Nov. 1855).

According to our records Lindley was not present at the 1 July 1858 extraordinary meeting of the Linnean Society at which the Darwin and Wallace papers were read. However, he was soon made aware of the *Proceedings* when a copy was sent to the *Gardeners' Chronicle* for review. Lindley wrote (22 October 1858: 735):

"The first part of the third volume of this important work attests the determination of Council to maintain the reputation of the Society as a great centre of scientific natural history: ..... among others is a most suggestive paper by Mr. Darwin on variation among organic beings which we extract entire".

There then followed Darwin's paper in its entirety without further comment.

Despite his apparent rejection of the theory of progressive development way back in 1833 (see vol. 1 of Lindley and Hutton's *Fossil Flora of Great Britain*: Chaloner in Stearn, 1999: 171) it is quite clear that Lindley found the evidence for natural selection put forward by Darwin and Wallace compelling and coupled with his own experience with plant hybridisation he became an evolutionist (without really knowing it, added Hooker!). From this point in time his reviews in *Gardeners' Chronicle* took a much more objective stance (see for example his review of Watson's *Cybele Britannica* – in

which he points out that despite the author having no true species concept he yet manages to produce four octavo volumes – 12 Nov. 1859). When the *Origin* itself was published, however, Lindley felt it needed someone who had been steeped in natural selection rather than himself, a relative newcomer to the field, to be the reviewer so he passed the *Gardeners' Chronicle* review copy to Hooker. Thus the ensuing copy published on 31 December 1859 was written by Hooker and not by Lindley as Darwin initially suspected.

Following the publication of the *Origin*, Darwin spent much time working on the pollination mechanisms of orchids as well as variation in domestic animals and plants. During this period he wrote on two occasions to Lindley about orchids. First in October, 1861 telling him

“I have been extremely interested in *Catasetum* and indeed with many exotic orchids”.

Then again in the following month on the compound origins of the labellum. The next year (1862) saw Darwin testing the fecundity of the purple and yellow leaved fern *Heterocentrum roseum* using plants given him by John Lindley. Sadly, by the spring of 1862 Lindley's health was beginning to fail and his memory declined rapidly and he could not read for more than a very short time.

Meanwhile in May Darwin published his book entitled *On the various Contrivances by which British and foreign Orchids are fertilised by Insects and the good Effects of Intercrossing*. In the book Darwin acknowledges his debt to Lindley.

“Dr Lindley has sent me fresh and dried specimens, and has in the kindest manner helped in various ways.”

Then following a review of the book in *Gardeners' Chronicle* he wrote to Lindley to thank him for his most kind review:

“One quarter of the praise which you have bestowed on it, coming from you to whom I have long looked up, would I assure you have much more than satisfied me. Considering that you are the great authority on orchids the cordial tone of your article strikes me as something much more than merely kind”.

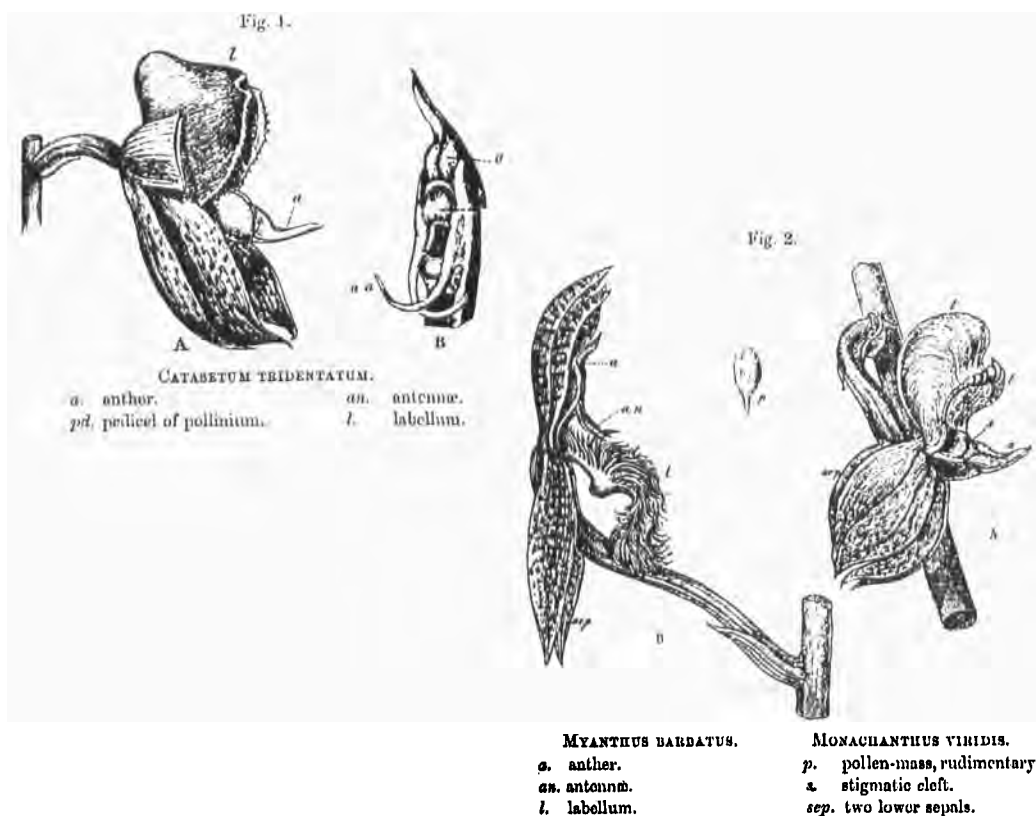
As the review, like that of the *Origin* had been written by Hooker, not Lindley, Hooker explained the error in a letter to Darwin (7 Nov. 1862):

“the fact is between ourselves I fear that poor L. is breaking up – he said that he could not fix his mind on your book”.

Earlier that year (5 April 1862) Darwin had read a paper to The Linnean Society on “Three sexual forms of *Catasetum tridentatum*” about which he remarked in a letter to Bentham:

“I fear the paper will no means be worth Lindley's attendance” (30 March 1862).

Originally Robert Schomburgk, collecting in British Guiana, had reported a species of *Catasetum* which he identified as *C. tridentatum* with several kinds of flowers. Three distinct flowers which he believed constituted 3 genera: *Catasetum tridentatum*, *Monacanthus viridis* and *Myacanthus barbatus*, all growing on the same plant. He sent home to the Linnean Society several plants which Darwin examined: of these, one



turned out to be the male flower of *C. tridentatum* (Figure 1) and the other, with two types of flower on the same spike, were merely male and female flowers of *C. barbatum* (Figure 2). The material was preserved in spirit and sent home to the Linnean Society where Darwin was allowed to see it courtesy of the President (Bentham). Darwin identified the flowers as female, male and hermaphrodite (see *J. Proc. Linn. Soc. Bot.* 6:151–157). It is now clear, however, that he had confused two species with female flowers very much alike, but with very different male flowers. Instead of having a single species with three sexual forms, Darwin's female flower belonged to *C. barbatum*, his presumed hermaphrodite flower was in fact a male flower of *C. barbatum* while his male flower belonged to *C. tridentatum* (now *C. Macrocarpum*).

In fairness we must report that Lindley was equally confused. Back in 1837 in the *Botanical Register* he described the orchid *Myanthus cristatus* changing into *Monacanthus viridis* and combining the features of not only both genera but also those of *Catasetum*. This information Darwin used in his Orchid book pointing out that according to Lindley *Monacanthus*:

“resembles closely in external appearance that of *Catasetum tridentatum*.”

Lindley had also published in the *Botanical Register* for 1832 the case of two forms of flowers appearing on the same scape of a species of *Cynochos*, from which Darwin deduced that this was analogous with *Catasetum*!



Clue: An explorer of the Arctic, Pacific islands and Central America.

In his book on domestication Darwin cites Lindley's articles, carefully extracted from *Gardeners' Chronicle*, on some 20 occasions using information on such diverse topics as cabbage varieties, apples, origin of peaches and nectarines, monoecious strawberries, bud variation in gooseberries, heredity diseases in plants, double flowers, sterility in *Acorus culamus*, resistance of plants to cold, etc. In doing so it did not escape his notice that in January 1858 Lindley had reported in *Gardeners' Chronicle* the successful raising of a hybrid between the two orchids *Calanthe furcata* and *C. masuca* in the Exeter Nursery by John Dominey, for which he had proposed the name *Calanthe dominii*.

#### Reference

STEARN, W.T., 1999. *John Lindley 1799–1865 Gardener-Botanist and Pioneer Orchidologist*. Bicentenary Celebratory Volume, Edited by William T. Stearn. Antique Collectors' Club, Woodbridge, Suffolk, 1999.

B.G. GARDINER

The October Quiz produced 5 winners (including E.D. Hatch) all of whom will receive either a mug or a reprint from the Society Archives.

## Correspondence

14.7.99

Zoology Dept., University of Guelph,  
Ontario, Canada.

Dear Sir,

In the article on George Busk (15(2): 6–12) it is stated he described the morphology and life cycle of the Guinea worm in the *Transactions of the Microscopic Society of London* (1849). In this article he did describe in a very preliminary way a gravid female specimen but he thought males did not exist and speculated that larvae he found in the adult penetrated the skin of humans from water.

The Russian Fedschenko in a celebrated article in 1871 showed that larvae were ingested by aquatic crustaceans (copepods) in which they developed to the infective stage. Humans acquire the infection by ingesting infected copepods with their drinking water. Fedschenko was only 27 at the time and died two years later in a climbing accident on Mont Blanc.

Yours truly,  
R.C. ANDERSON

9.8.99

Glasgow Caledonian University,  
Cowcaddens Road, Glasgow G4 0BA

Dear Sir

### **Some thoughts inspired by reading Jared Diamond's *Guns, Germs and Steel***

Jared Diamond's book *Guns, Germs and Steel: A Short History of Everybody for the Last 13,000 Years*, is an exemplary effort in the much needed field of inter-disciplinary or multi-disciplinary thinking about the embeddedness of human history within the world's natural environment. Not only is it a thoroughly dialectical interpretation of the interactions between nature and human society, but it grasps the complex interplay between two kinds of evolutionary development, each affected by and affecting the other. And though describing things in this way appears immediately to dichotomise reality into 'nature' and 'society' according to convention, actually the book transcends such dichotomisation in the living treatment of its subject.

A sociologist reading this book is bound to be reminded of sociology's endemic inadequacy in this matter. Sociological theories of history have certainly recognized the importance of 'Nature', within which human history must perforce happen, but they have either drawn upon particular facts of natural environment to explain social phenomena in an arbitrary and *ad hoc* manner, or they have treated the issue abstractly. As an example of the first is Marx's and later Marxists' granting of importance to particular geographical features which inclined certain societies toward large-scale irrigation schemes, as in ancient China, which in turn were the foundation for specific features of Chinese civilization and the Chinese state. As for the second, Marx and later Marxists, as well as other major sociological theorists, failed to look at the specifics of geographical, climatological and ecological realities in the context of given societies. Dealing in generalities they failed to see that the interactions between particular societies and particular natural environments should be treated as scientific questions,



not philosophical ones. They made the very mistakes concerning these matters that they rightly accused physical and biological scientists of making in respect of social systems: ignoring the specific, *sui generis* character of the different, basic or emergent, levels of reality being studied. Just as, for example, sociobiologists all too often know little about the fruits of 150 years of sociological research, sociologists study agricultural societies and their histories without studying the sort of material dealt with in Jared Diamond's book. They do not seem to see that they must study empirical ecological material as ecologists. This is the same as the way natural scientists do not usually see that different methods, skills, and experience from their own are needed to arrive at explanations of empirical social phenomena. Both seem to think 'common sense' or a little mugging up in the 'other' kind of discipline will do, which it won't.

This unfortunate state of affairs is the result both of the characteristic dualisms of western thought (mind/matter, freedom/determination, and arts/sciences among others), and more specifically to the 'project' of the European Enlightenment and earlier, subsequently sustained in nineteenth and twentieth century developments in sociology, which was concerned precisely to emancipate humanity from nature. At the same time as the rigorous scientific study of nature was getting comprehensively under way, sociology was concerned to show it must *not* be reduced to biology or physics; and this insistence was part of a commitment to the belief that human beings could shape their destiny, increase their freedom and happiness, through their conscious and collective actions based on the use of reason. This served to split the science of society off from the science of nature, at the very moment that both agreed human progress rested upon the scientific understanding of nature. But sociologists did not think they needed actually to study this science of nature that they recognized and regarded as so important, whilst natural scientists assumed they could imperialistically study society through their own methods, without further reflection upon the specific ontology of society. One chose ignorance of the other, the other ignorantly thought it could know the first without special effort.

So it is, therefore, that in Diamond's book we realize that we cannot understand the major movements in human history, from hunter-gathering to agriculture, the emergence of civilizations, or modern colonialism and imperialism, without a close study of the opportunities and restrictions offered or imposed in prehistory in different parts of the world by the availability of animal and plant species suitable for domestication. This issue looms far larger either than one could have imagined before reading the book, or can find in theories of historical transformations in modes of production (in the Marxist sense of this term). The book can genuinely be defined as a work of *ecological historical sociology*, as it is self-evidently ecological and historical, but is also sociological in that all the major aspects or dimensions of human societies come in for some consideration – technology, economic relations, social structure, political institutions, culture and ideology – and are treated as interacting processes within dynamic, contradictory totalities. But unlike most sociology, the social totality is treated as one totality within wider totalities – those of nature, which are also dynamic and undergoing continuous transformations.

Yours sincerely,

TIM CLOUDSLEY

21 August 1999

Gothersgade 143,  
DK 1123 Copenhagen,  
Denmark

Dear John Marsden,

After a long-lasting correspondence with B.E. Smythies I became a little worried at the beginning of August, when I hadn't got an answer to my last letter for more than a month. I phoned the Society to hear if you had any news about him, and got my worst forebodings confirmed when I was told he had passed away two weeks ago. The kind invitation from The Linnean Society in 1998, which gave me an opportunity to meet this extraordinary man, turned out to be quite a bonus following the Jill Smythies Award. Our meeting was very short indeed, but back home a letter was awaiting me, explaining his hasty retreat.

The ensuing exchange of letters has been as extraordinary as anything, verging on the serious – as well as the absurd. He insisted on calling me Dear Sheriff because he knew I once had a stint as such in Greenland, and always answered my letters the same day he got mine. I couldn't live up to this, and when I complained about his using his typewriter as a machine-gun, he signed himself B.E.S., the fastest gun in Surrey County. When he complained about an eye-pad he was compelled to use at intervals, I told him he would be the obvious choice for a part in a new shooting of *Treasure Island* and a letter came back signed Bill, understudy for Long John Silver.

A very shy man, I was told at Burlington House, but not my impression. How could a shy man have compiled such an amazing number of personal relationships and connections, as evident from his letters? When I told him of my 35 still unpublished illustrations of Lauraceae for Kostermanns, he had met him in Kuching in Malaysia, where he was known as an enfant terrible, as here in Denmark. Telling about Bengt Jonsell from Sweden, he, of course, knew him from a congress in Spain, where they together had listened to the wood lark, *Lululla aborens*, in a glade. After my recommending the newly published autobiography by Kermode, he affirmed that he would try to get it from the library, and naturally had been in connection with him lately.

So it was all the way through. Life member of the Himalayan Club, the Kipling Society, contributor to O.E.D. and much else besides. A man of widespread interests and, while I may not be a competent judge of this, a seemingly comprehensive literary knowledge.

Shy? Maybe on personal matters. The closest I got was a little piece of paper, stuck to a letter-sheet in an offhand way, with a few lines by Rainer Maria Rilke:

*Herbsttag*

Wer jetzt allein ist, wird es lange bleiben,  
wird wachen, lesen, lange Briefe schreiben,  
und wird in den Alleen hin und her  
unruhig wandern, wenn die Blätter treiben.<sup>1</sup>

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1 "An Autumn Day: He who is alone will remain so for a long time, will wake, read, write long letters, and will roam in solitude anxiously hither and thither, wherever the leaves direct."

It touched me deeply, and now I feel a personal loss, not only of a pen friend, but much, much more.

I am convinced many others will acknowledge his inspiring influence, not least the recipients of The Jill Smythies Award for Botanical Illustration he so generously and considerately set up in memory of his wife.

BENT JOHNSEN

(Winner of the Jill Smythies Award in 1996)

The opening verse is:

Befiel den letzten Früchten voll zu sein;  
gib ihnen noch zwei südlichere Tage,  
dränge sie zur Vollendung und jage  
die letzte Süße in den schweren Wein.<sup>1</sup>

[The share of the residue of Mr. Smythies' estate which has come to the Society, with his natural history books and instruments, totals £150,000. Letzte Süße, indeed - Ed.]

At a recent event in the Society's rooms, an elderly lady purchased some of the cards we sell; they were from botanical illustrations by Elizabeth Twining. Were we aware that Mrs. Twining's maiden name was Smythies? Apparently Mrs. Twining (1805–89) was part of the same family as Mr. Smythies. The lady remembered in her childhood a very young Bill Smythies, whose family lived in India, spending his English school holidays with her family in Devon. – Ed.

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## From the Archives

*The Reverend Richard Dreyer*

*and his illustrated copy of Sir James Edward Smith's Flora Britannica, 1800–04*

In an earlier article (*The Linnean* 12(4): 16; 1997) mention is made of a unique copy of *Flora Britannica*, 1800–04, 3 vols in 2, in 8vo, by Edward Smith, President of the Linnean Society, formerly belonging to the Revd. Richard Dreyer LL.D., FLS, of Bungay, Suffolk, now in the Society's library. In that era, small botanical books – even floras – did not usually have plates so it is a great surprise, on opening these volumes, to find that they are copiously illustrated. In the margins of many pages, there are paintings in water-colour, of the flowers described. They are true botanical illustrations complete with root-stock, floral parts, etc., accurately drawn and all cleverly fitted into the confines of the inch-wide space. [The height of the uncut pages is 8½ – 9 inches; the bottom margin is 1-1½ deep].

Richard Dreyer (1763–1838) obtained his degree from Trinity Hall, Cambridge, in 1785. His first living (1785 – c.1823) was at Woughton-on-the-Green (near Milton Keynes), Bucks. In 1799, he moved to Bungay to become Rector of Thwaite St Mary,

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<sup>1</sup> "Order the last fruits to be full; give them a couple of extra southerly days; oblige them to ripen and seek the last sweetness in the heavier wine."



Plate from James Sowerby's *English Botany*



Found by R. Mann Esq. with whom I gathered it Feb<sup>y</sup> 24<sup>th</sup> 1831  
on the left hand of the Road from Meltonham to Ellingham  
Mills, near a foot Bridge. *certainly wild*  
R. Dreyer.

## VI. HEXANDRIA.

## I. MONOGYNIA.

167. GALANTHUS. G. Pl. 160. Juss. 55.  
Cor. supera, hexapetala; petalis tribus interi-  
oribus brevioribus, emarginatis. Stigma sim-  
plex.

## +1. GALANTHUS.

Galanthus nivalis. Sp. Pl. 413. Hudf. 140.  
With. 331. Engl. Bot. t. 19. Dickf. H. Sic.  
fasc. 6. 2. Abbot. 73. Jacq. Austr. t. 313.  
Leucoium bulbosum præcox minus. Ger.  
em. 147.

Narcissus 6. Camer. Epit. 956.  
Angl. Snowdrop.

In pratis, pomariis, et ad fepes.

At the foot of Malvern hills, Worcestershire. Mr.  
Ballard. On the banks of the Tees about Black-  
well and Conniscliffe, certainly wild. Mr. Rob-  
son. Bedfordshire. Abbot. *Yorke. Meddleton.*  
*Leucoium bulbosum*  
Perennis. Fl. Februario.

Bulbus ovatus. Folia bina, obtusa, carinata, glauca, basi  
membranâ integrâ vaginatâ. Scapus teres, nudus,  
uniflorus. Spatha cylindrica, apice sæpius bifido.  
Flos pedicellatus, nutans, niveus, inodorus. Petala  
obovata, concava, carnosa; interiora intus viridi striata,  
apiceque extus maculata. Stamina ex apice germenis.  
Antheræ subulatæ, apice poris duobus. Stigma acu-  
tum. Capsula trilocularis, trivalvis. Semina globosa.

168. LEUCOJUM. G. Pl. 160. Juss. 55.

Cor. supera, hexapetala, campanulata; petalis  
apice incrassatis. Stigma simplex. Stamina  
æqualia.

1. LEU-



Norfolk, about 3 miles to the north. He remained there until his death. Dreyer was also Chaplain to Richard, 7th Viscount Fitzwilliam MA Trinity Hall 1764, FRS 1789, whose collections, at his death in 1816, were the foundation of the Fitzwilliam Museum, Cambridge. Dreyer married a Norfolk girl, Eliza Dade, 10 years his junior. She died in 1849, aged 76. There were no children.

Dreyer became a Fellow of the Linnean Society in 1817; his sponsors were all eminent botanists and entomologists. They were Thomas Jenkinson Woodward FLS 1789, who lived at Bungay until 1801; Robert Stone FLS 1790, who lived at Woodward's house and worked with him; their mutual friend, Dawson Turner FRS 1802, FLS 1797, of Great Yarmouth; John Hatchett FLS 1806, an entomologist of London; and Sir Thomas Gery Cullum FRS 1787, FLS 1790, a physician at Bury St Edmunds, and great friend and advisor of Smith's. Cullum made an annual tour about England, visiting Smith and the other friends. Indeed they were all in frequent correspondence with the President and with each other, often exchanging botanical information and plant specimens. These were sometimes 'couriered' by Robert Stone, who also took plants to the botanical artist, James Sowerby, in London. As well as the paintings, Dreyer also inserted botanical notes into the text of the *Flora*, proving that he enjoyed a wide acquaintanceship amongst botanists, men of letters and the clergy all over the country.

On examining the illustrations, two questions spring to mind: who painted the flowers and are they taken from nature or copied from published works? They are expertly done, with scarcely a sign of pencil or of corrections. The colours are still fresh and painted with confidence straight onto the page. This might suggest a lady's hand, perhaps his wife, or a daughter, well schooled in the art of flower painting, a popular pastime of the period, and with the time needed to devote to this delicate task. On reading Dreyer's Will, however, he actually itemises the *Flora* and states that it is "illustrated with drawings of my own". From his notes, it is clear that some of Dreyer's paintings are, indeed, taken from nature. Most of them however, are 'copied' from contemporary sources, and mainly from James Sowerby's *English Botany*, a series of 36 volumes in 8vo, begun in 1790 and continued regularly until 1814.

That the paintings are clearly based on published plates implies no criticism of his work. To fit an illustration considerably larger in the original [plate size 6½ x 3½] into the narrow space of a margin and still retain all the details, in proportion, requires particular skill and a steady hand. Dreyer is in fact sometimes constrained to turn a flower to face the other way round, or cut off part of the outer leaves, or petals. The problems of reduction are made more difficult when the original comes from *Flora Londinensis*, 1777–98, a 6-volume work in folio, by William Curtis, with plates twice the size of the whole page of Smith's *Flora*. Did Dreyer use the newly-invented (1807) camera lucida? This is an optical aid which, by means of an angled prism, allows the subject to be 'traced' directly onto the page. It was extensively employed for landscape and architectural drawings and in conjunction with a microscope, is still in use by botanists and entomologists today to obtain an accurate image.

The Last Will and Testament of Richard Dreyer is dated 5 July 1818, a year after he became a Fellow. In it he states that he gives the *Flora Britannica* to "the Royal Linnean Society of London", together with "all my drawings and Manuscripts relating to the

Science of Botany". In a Codicil, dated 1 December 1824 however, he revokes this gift. The Society did, eventually, receive the *Flora*, donated by Mrs Dreyer after her husband's death [*Trans. Linn. Soc.* 18(4):720; 1828–41], but his MSS and drawings have not found their way into the library. Had they done so, they might have thrown some light on his botanical and entomological knowledge and his artistic ability. Also whether he had his own herbarium of dried specimens. His neighbour, Robert Stone, possessed an almost complete herbarium of British plants. Maybe Dreyer was able to consult this rich source material.

No reason is given for Dreyer's change of mind towards the Society. One possibility could be his intense dislike of Dissenters. In the Will, he specifies that his funeral "shall not be served either directly or indirectly by any person who shall be a Dissenter from the Church of England". Earlier, in December 1815, he had published a sermon that he had preached against them. At a time of impending social and political change, the controversies between the Established Church and the Nonconformist bodies were intensifying. When Smith, a known Unitarian, applied for the Chair of Botany at Cambridge in 1818, he sparked off a considerable discord amongst leading personages of the University and the Church. Several of them were Fellows of the Linnean Society. Sir Thomas Cullum (one of Dreyer's sponsors) naturally encouraged his friend, Smith, to pursue his ambition, going against the established rules, which excluded Nonconformists from the Universities of Oxford and Cambridge. Heated correspondence both for and against the appointment followed; pamphlets were published. The dispute continued over several years. Dreyer, a Cambridge graduate and FLS, must certainly have been cognisant of the affair. Undoubtedly greatly disturbed by the attitudes of certain Fellows, and perhaps already stricken by his last illness, did Dreyer withdraw his gift to the Society as his own personal protest?

In the church at Thwaite St Mary, there is a monument to Richard Dreyer, which says that "a long and severe affliction" deprived him of the energies and powers of an intelligent and cultivated mind". Was this Alzheimer's disease – an illness which can cause obsessional paranoia – beginning to show its symptoms at about the age of 60? Dreyer was 55 when he made his Will; the Codicil was six years later. It was at about this time that he gave up the living at Woughton. He died at the age of 75. Understanding something of the nature of his unsound mind, did his wife strive to make amends to the Linnean Society by donating the *Flora* after he died?

Whatever the truth, Richard Dreyer's beautifully illustrated volumes deserve close inspection, as much for his artistic prowess as for the comments he added to the text. It was not uncommon for botanists to add notes and illustrations to a favourite book, and much extra knowledge can be gained from them. Lack of further data prevents any assessment of Dreyer as a botanist, but a list of those species which he chose to illustrate has been compiled. A study of this might show whether it constitutes a flora of the Bungay area or whether the plants represent only a random selection. A list of the persons mentioned in his notes demonstrates the breadth of his acquaintance. The books themselves are on show in the library from time to time to be admired by all.

## Helen Beatrix Potter

Beatrix Potter is well known for her children's books and in Linnean Society corridors by the supposed confrontation between male dominated science and herself, or could it have been a confrontation between personalities? W. Phillip Findlay in his volume on fungi in the Wayside and Woodland series, illustrated with Potter's paintings, said

".....But Beatrix Potter was more than an enthusiastic amateur collector and artist. She had the mind of a professional scientist and biologist –"

What reasons induced him to say that? This thesis will be addressed below.

Last year the Linnean Society and the British Mycological Society joined forces and presented a contribution on fungi to the Edinburgh Science Festival. The theme traced aspects of mycology from Beatrix Potter's time to the present with Dr. Mary Noble presenting a paper on Beatrix as a woman and her connections with the Dunkeld postman and naturalist Charles McIntosh; Professor A.J.S. Whalley, John Moore's University, Liverpool showed how fungi effect all aspects of every day life and Dr. S. Moss, Portsmouth University demonstrated modern techniques in studying fungi which we all know Beatrix Potter would have wondered at, especially the electron microscopy as she was among other things a very competent microscopist, and no doubt all these ideas would have stimulated questions in her mind!

After sifting through her folios of coloured illustrations and line-drawings, and through translations of her journal, the present author presented information on how she developed such a deep interest in mycology both at the Science Festival and, in April 1997, at a Linnean Society meeting. In her time the study of fungi was, as now, a "cinderella" subject and for a woman to study these organisms was even more unusual. But why should it be so? Alas, the great interest that my colleagues and myself have in these organisms has been overshadowed for centuries by the study of plants and of the larger animals. This is truly unfortunate as fungi now form the basis of much industry and commerce and studying them *in situ*, as shown by Beatrix Potter, is open to everyone from child to pensioner.

So what was Beatrix Potter's contribution? She undoubtedly had a sharp brain and asked questions, the answers to which have come to light only latterly. I can categorize the various threads of her activities into five main topics; (1) biorecording, (2) germination of fungal and lichen spores, (3) the role of algae in the lichenized fungi, (4) asexual stages in the life-cycle of macromycetes and (5) questioning whether there were such things as hybrids in this last group.

With Beatrix Potter's accurate documentation of all the fungi she illustrated there is no doubt she was aware of the differences in habitat of different fungi, their fickle appearance and, for many, their rarity. Although like most good naturalists she took these factors as a natural extension of her illustration, today such activities have become very fashionable. It is through examination of field data such as these that we begin to unravel the mysteries of our natural world. Two case studies can be extracted from the considerable bulk of Potter's notes. In 1889 a collection of the 'Old Man of the Woods', *Strobilomyces floccopus*, then unknown in Scotland, was found at Crieff on a



foray of the Cryptogamic Society of Scotland. Although Beatrix did not take part herself she knew one of the Perth Drummond Hay family who did, and who brought the specimen to her to paint. In this way, by chance, *Strobilomyces floccopus* came to Beatrix's hands; the actual illustration is in the Perth Museum and Art gallery having been presented as part of a collection of Potter papers from Troutbeck, Ambleside. Potter later realised how rare this fungus was when she collected another specimen in the grounds of the most famous of her family's holiday residences, Eastwood, on the side of the Tay. She painted this collection three times and on the back of the one in the Perth museum there is a map of the locality, the site sadly now having been replaced by a lawn. The specimens were sent to the Rev. John Stevenson, an expert at that time who made an entry of the find in his working copy of *British Hymenomyces*. This fungus, while rare in Scotland, is a feature of the area of Perthshire frequented by the Potter family whilst on holiday. It has been found in the last twenty years at Blackspout Wood Pitlochry, Blair Atholl, Killiecrankie and Faskally; these areas all represent fingers of oakwood which push up into Central Scotland. By 1897 she was very conversant with the British species of larger fungi, probably more so than the members of the staff then at the British Museum, and was confident enough to identify this same fungus for Charles McIntosh, the famous Dunkeld naturalist who helped her so much in her early career.

"..... The fungologist at Kew said he had only seen it once – in the summer of '95 – when he found any quantity in a wood near Watford....." (The only signed letter from Beatrix Potter to C. McIntosh and dated January 22, 1897; the fungologist at Kew would have been George Massee, who was a Fellow of the Linnean Society).

In her collections of illustrations there is one in which she figures the fruiting body, ascus and ascospores – some germinating of a small discomycete which is now called *Lachnellula willkommii* and is the causal organism of canker in larch; on the same page she also illustrates the closely related *L. occidentalis* which is confined to old, fallen twigs. In her notes Beatrix indicates the difference between these taxa based on observations in Scotland, the Lake District, Gloucestershire and Surrey all places where the family spent holidays. The microscopic differences were only demonstrated many years later but in correspondence with Charles McIntosh she discussed his idea of a possible connection between the canker forming fungus and aphids.

" Thank you very much for your interesting letter about the larch disease. I have taken note of it in the Lake District but never saw any aphid but of course it is a disadvantage not to be able to examine the trees at different seasons. I should think if a tree is weakened by one parasite it is less able to withstand the attack of another; or possibly the peziza spore may get into the larch through the blister and bleeding caused by the aphid. The peziza mycelium is very vigorous and spreads in the red lower layer of bark, I have seen it come out in that layer on a broken dead branch at several inches from the fungus. I quite came to the same conclusion about the bleeding of resin, – that it is the peculiar constitution of the larch which does the mischief; I think the fungus does not penetrate at all deeply but that the scar, being open, eats into the trunk. It is so bad in Westmorland that one does not find a straight stem in 500. The woodmen think that it is caused by replanting without cleaning up, and if the fungus is the cause they are right to some extent, because it breeds to an extraordinary extent on heaps of sticks. There is something odd about that particular fungus, supposing it is the cause of the disease for others like it seem harmless. I have seen

one very like it in Gloucestershire & Surrey but the live trees were scarcely diseased at all .....". (Letter to Charles McIntosh, dated Jan 22nd, 97; 2, Bolton Gardens, S.W.).

Little did she know that years later there would indeed be an important disease of beech caused by the union of woolly aphid and an until then saprotrophic *Nectria*. Beatrix actually figures on the same plate as the *Lachnellula* a *Nectria* and from the spore characters and habit it can only be *N. cucurbitaria*, so although she did not realise the significance of this small perithecial fungus she illustrated it accurately enough to allow identification.

This shows parallelism with her plate of *Aleurodiscus amorphus* known to Beatrix as *Corticium*, and which Charles McIntosh (who is very probably the model of her character Mr McGregor in the Story of Peter Rabbit) was asked to collect for her.

".....Do you think you could get me a fungus called *Corticium amorphum*? It grows on fir bark and looks at first like *Lachnea calycina*, but afterwards sticky like *Dacrymyces*....." (Letter to Charles McIntosh dated Jan. 12th, 97; 2, Bolton Gardens, S.W. The *Lachnea* referred to is *Lachnellula* noted above, the epithet being preoccupied).

In this illustration, in addition to the fruiting bodies, she showed the basidium and basidiospores including one germinating, the first time as far as we can tell, that this had been achieved. In addition there are germinating spores of *Alternaria*, a common *air spora*, and some small, hyaline globose bodies. In her letter to McIntosh she describes accurately that the fungus becomes like *Dacrymyces*, gelatinous in age; her illustrations allow us to identify this gelatinization as being caused by a parasitic *Tremella* on *Aleurodiscus*.

This is the first record of *Tremella simplex* for Britain. Following this interesting observation examination of herbarium material in Edinburgh and in Kew was undertaken (the latter by Peter Roberts) and the results indicated that the fungus is rather widespread wherever the rare *Aleurodiscus* is found. It was on the occasion of the European Congress in Ambleside that Dr. Jim Ginns from the Canadian Agricultural Services, having examined Beatrix's original painting, brought this possibility to the attention of mycologists after seeing the 'small, hyaline, globose bodies' mentioned above. Why ask specifically for *Aleurodiscus*, a rare fungus at the best of times, to carry out her studies? After all, there are many other fungi in which to study spore germination but not many with a distinctive mycoparasite growing with it!

As indicated in this same letter and in other later communications Potter had become quite familiar with the discomycetous fungi and had put on record through her illustrations some unique observations on germination; obviously she wished to do more –

".....I should be glad if any pezizas, Mr Masee at Kew Gardens can name them from dried specimens. He says they have been drawn less than agarics and advised me to keep to one division of fungi. I find plenty of microscopic pezizas but no large ones yet....." (Letter dated Aug 20, 96; 2, Bolton Gardens, S.W)

From her journal and letters we learn that Beatrix Potter visited the British Museum, which was only a short walk from Bolton Gardens, on several occasions wishing to get to grips with the idea of the dual origin of lichens. She had read extensively and attempted to

cultivate both the spores of what we now call the mycobionts and cells of the algal partner. She illustrated extensively her experiments and many can be seen in the collections of her works in the Victoria and Albert Museum. Although she encountered many contaminants in her work there was still enough information which led her to support this then rather unfashionable hypothesis. Her searching questions as to whether the algal partner had spores, whether the partners were symbiotic and how the two partners came together etc., and her persistence, had people running from her. Mr George Murray '*fled and so did Miss Smith the librarian*'. She was one of the small band which believed in the dual organism theory, a group which was to become larger when more and more studies were carried out; we now know that these organisms are indeed mutualistic and are termed lichenized fungi; they are even classified within the fungi.

In a letter she writes

".....My difficulty about lichens is to find ripe spores for experiments, I scarcely know what to look for. I have succeeded in growing spores of *Cladonia*, but larger spores would be more convenient. You see we do not believe in Schwendener's theory, and the older books say that the lichens pass gradually into hepatics, through the foliose species. I should like very much to grow the spore of one of those large flat lichens, & also the spore of a real hepatica in order to compare the 2 ways of sprouting....." (dated Jan 22nd, 97; 2, Bolton Gardens, London S.W.).

All this activity in germinating spores of as wide a range of her finds as possible made her realise that many fungi had 'mould' states and she indicates in her letters to McIntosh that it should be more universally appreciated that agarics had conidial forms, something which was not widely known except by those who had read the volumes on fungal biology by the German mycologist Oscar Brefeld. Beatrix considered his work not thorough enough, referring to him as a *Dacrymyces*, a genus mycologists know as producing a jelly-like and polymorphic unstable fruit-body – see the above discussion on *Aleurodiscus*.

".....What I have been doing is to sort out the 'Hyphomycetes' which in great part are not real 'species' at all, which has been suspected for a long time, but it was not previously known that they belonged to Agarics as well as to pezizas..." (Letter to Charles McIntosh dated Feb 22nd, 97).

and

".....I am trying to work out the moulds = conidial forms, of the mushrooms; exceedingly difficult to grow...." (Letter to Charles McIntosh dated Sept. 21st, 97)

This was a quite startling revolution. The present author and Professor Kendrick revealed at the Kananaskis conference in 1978 how important these stages are in the biology and taxonomy of the larger fungi. Nor had she given up her work with fungi after the Linnean meeting as often supposed; she was still asking McIntosh to supply *Aleurodiscus* in her continual search for an understanding of mutualism – she actually labelled in pencil the *Aleurodiscus* 'lichen' on the back. Was she thinking (what we know now) that some jelly fungi are mycoparasites and form in the field compound structures involving two organisms?

It was the work on germinating basidiospores of agarics which was the subject of her

paper presented to the Linnean Society in April 1897 and entitled 'Germination of the spores of the Agaricineae '.

".....I have grown between 40 & 50 sorts of spores, but I think we shall probably only send in *A. velutipes*, which I have grown on twice and Mr. Massee has also grown according to my direction at Kew."..... (Letter dated Feb 22nd, 97; 2, Bolton Gardens S.W. *A. velutipes* refers to the fungus now known as *Flammulina velutipes*; see below).

She had taken a considerable amount of time over the preparation of the paper with much heart searching and even worked over Christmas of the previous year and into the New Year holidays.

"..... My paper was read at the Linnean Society and 'well received' according to Mr. Massee, but they say it requires more work in it before it is printed" (Letter to Charles McIntosh dated Sept. 21st, 97).

Alas, we do not have the manuscript. Although her results were accepted by biologists such as George Massee, we cannot judge what modifications were necessary; the additional work required was never completed and so sadly the paper never appeared in print. Massee was antagonistic at first towards her results, incidentally, but subsequently realised the significance of her studies.

*Flammulina velutipes* grows well in culture and produces a white fluffy mycelium; the spores do not require any prior special treatment, which was just as well as Beatrix Potter worked in her kitchen. Although she was very successful, such primitive working conditions would not be tolerated by mycologists today.

She writes in her journal and letters that her uncle Sir Henry Roscoe had read an early version and made suggestions. The only legacy of her outstanding work in this field is to be found in the folios of illustrations found in the Armitt Trust, Ambleside, Perth Museum, and in The Victoria & Albert Museum.

As indicated earlier, although Beatrix Potter had worked on many subjects the major part of her work was based on using *Flammulina velutipes*, the supply of fresh material for which she relied in part on Charles McIntosh.

"...The last plants were particularly beautiful, *Agaricus variabilis* is almost like a pansy, and *A. velutipes* also very handsome. A curious thing has happened to the piece of broom on which the latter was growing, it was put away in a tin canister and forgotten, and now another species of fungus has sprung up. It is pale straw colour, grown entirely in the dark, and there are nearly 100 fingers, the longest measures 1.25 inch. Miss Potter wonders whether it grows out of doors at this season or whether it is brought out by the heat of the room? it was about this size (sketch) when first observed but being moved into a hot cupboard near the kitchen chimney, it puffed out in a very odd shape. The last shoots that have grown are the same size all the way up....." (Letter with sketches to Charles McIntosh dated Dec. 10th, 92; 2, Bolton Gardens, S.W.)

In fact the excentricities of fruit-body development she illustrated were of the very same fungus, *F. velutipes*; it is rather surprising she did not realize this. When the canister was opened there was an etiolated cluster of basidiomes. Little did she appreciate that fifty or so years later very much bigger, etiolated fruit-bodies of this same fungus would be on our supermarket shelves for sale as food. The Chinese,



*Flammulina velutipes* – watercolour on paper.

Japanese and others in S.E. Asian countries have long been growing this fungus to produce long, pale yellow straws under the name of Enoki. The fruit-body when found in the field is edible, although rather tough and gelatinous and said to contain compounds thought to aid one's health. As etiolated specimens, however, they are considered a delicacy. The idea that these elongated basidiomes might be a different fungus was confirmed by her finding it again in Jan. 1897:

"I think I have found the new fungus again, I can hardly describe the difference, it is drier than *velutipes*, both pileus & gills, rather broader & shorter and a peculiar smell, gills a deep yellow when old, also inclined to become discoloured in patches....." (Letter to Charles McIntosh dated Jan 22nd, 97; 2, Bolton Gardens, S.W. London).

Beatrix Potter spent some time at Coldstream and it was probably there that she pondered more extensively the question as to whether there are hybrids amongst the larger fungi, especially the boletes. The Border County of Scotland is a wonderful place to study members of the genus *Leccinum*, the rough-stalked boletes. There probably was an array of taxa then fruiting and because they look so alike with the characters appearing to run one into another this question was paramount.

"...Have you ever suspected that there are intermediate species amongst Agarics & Boleti? We are strongly of opinion, for certain good reasons, that there are mixed fungi – that is to say – either growing actually upon a mixed network of mycelium, or else hybrid species which have originated in that way. I do not express any opinion which way only that they are intermediate.

Of course such an idea is contrary to the books, except for lichens but I would be curious to hear whether you had had difficulty in naming any of the sorts which I suspect. Have you noticed whether fungi described as 'varieties', are constant in type?....." (Letter to Charles McIntosh dated Jan 12th, 97; 2, Bolton Gardens, S.W.)

These various morphologically separate but close species have been placed for generations under two names *Boletus* (= *Leccinum*) *scabrum* and *versipelle*. Charles McIntosh wrote to Beatrix in 1896 that:

"*B. scaber* & *versipelle* are very like I dare say one would need to see them pretty often to be able to know the differences easily".

The present author has been at pains over the years to demonstrate that they do represent truly different species and that hybridization is not involved. Recent DNA work supports the multitude of species. It is true that some hybridization has been demonstrated in a few pleurotoid fungi which, although considered distinct species in virtue of their distinctive DNA fingerprints, do occasionally mate, although the phenomenon is rare. Beatrix obviously realised the potential of using culture work to decide whether hybrids might form or not.

"...If I am right it will be possible to work out which of the Boleti are hybrids but it will take many years at the present rate..." (Letter to Charles McIntosh dated Sept 21st 97).

The 'we' in the letter dated Jan 97 must refer to Sir Henry and herself but nowhere is there evidence of any further discussion or expansion of this subject which is unfortunate for it has interesting possibilities.

The letter discussing the concepts of hybridization never seems to have been finished. Why we will never know. In fact Beatrix Potter's interest in mycology appears to finish also with this letter and although she illustrated fungi as part of her stories they only take from then on a very minor role. She had other interests and many personal hurdles to overcome. Perhaps she just became fed up and wanted to move on. Many years later she did just that with children's stories, becoming disillusioned and seeking new challenges – she moved on to rearing prize sheep! Surprisingly she also lost all

contact with Charles McIntosh as though wishing to keep the various compartments of her life separate. She was, after all, greatly indebted to McIntosh for the supply of fresh collections, discussion and guidance.

The original letters on which this paper has been based are deposited in the National Library of Scotland, with photocopies in the libraries of the Royal Botanic Garden, Edinburgh, the Armitt Trust, Ambleside, Perth Museum and Art Galleries and the Linder Trust at the Victoria and Albert Museum, London and the personal collections of Dr Mary Noble and myself.

#### *Acknowledgements*

I am greatly indebted to Dr Mary Noble, Bonnyrigg, Midlothian for her help and encouragement, particularly for involving me in the original discussions on the Dunkeld papers and giving me photocopies soon after their discovery and their significance was established.

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### **Beatrix Potter's fossils and her interest in geology**

Beatrix Potter became interested in fossils in her late twenties as a consequence of a visit to her cousins, the Hutton family, who lived at Harescombe Grange, near Stroud, Gloucestershire in June 1894.

The Hutton family had strong geological connections. The maternal grandmother, Sophia Holland of Dumbleton, near Evesham, was a renowned collector of Liasic fossils, particularly insects and fishes, while Robert Hutton of Putney Park was keenly interested in the earth sciences. Mary Hutton was a committed geologist whose collection of fossil sponges and Bryozoa from the Jurassic and Cretaceous was eventually donated to the British Museum of Natural History on her death in 1937.

Harescombe, a small village deep in the heart of the Cotswolds, is situated on the Inferior Oolite (the lower part of the Middle Jurassic). Much quarrying, both for building stone and for road metal, has gone on in the area. Consequently, there are numerous fossiliferous quarry faces to be scoured.

Although in her diary Beatrix only mentions fossil collecting on two occasions during her first ten day visit, Mary and Caroline Hutton took her to the most important Lower Limestone quarry on Huddinknoll Hill, some 350 yards east of Harescombe Grange.

"We went up on the common above the copse after dinner and picked up fossils"

and to the very much larger quarry on Scotescuar Hill:

"On Wednesday in the morning we went after fossils"<sup>1</sup>

By the time of her second visit to Harescombe Grange on Saturday, June 8th 1895, Beatrix had become an ardent fossil collector. After ten days she had not only collected many fossils, but had also photographed and painted a selection of them.



Figure 1. Gloucestershire fossils: *Magnosia forbesi* (Wright), palatal tooth of *Asteracanthus magnus* (Agassiz), fern frond and scales of *Dapedium dorsalis*. W/c on paper, June 1895.

The painting provides locality details and in some instances identification. The echinoderm labelled *Arbacia forbesi* is now *Magnosia forbesi* (Wright) from L.T.G. Scotescuar – in other words the Lower Trigonian Grit Scotescuar Hill, two miles north of Stroud. The specimen, which is comparable with those in the NHM collections is, or was, in the Reading University Geological Collection, where the residue of Mary Hutton's fossil specimens finished up.<sup>1</sup>

The fern frond, probably *Klukia*, has no information, although the fish scales at the bottom are labelled 'Upper Lias Dumbleton'. Dumbleton, is a village in North Gloucestershire and the fish, *Dapedium dorsalis*, comes from the Falciferum Zone (Exoratum Subzone) of the Upper Lias. I am uncertain of the fate of this specimen, however. Beatrix clearly collected it on a visit to Grandmother Holland's house, Dumbleton Hall, with her two cousins.

The single tooth in the top righthand corner is labelled 'palatal tooth, Interior Oolite, Huddinknoll', which is the quarry nearest Harescombe Grange. This specimen is now in the NHM having been donated by Mary Hutton in 1957, together with her sponges and Bryozoa. The Bequest ends:

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- 1 Scotescuar is an adapted place name – reflecting the extensive quarrying of recent centuries – The Cotswold Way passes through the corner of the quarry. O E, Scot = a steep place, yfer = edge or brow of a hill.
  - 1 The Reading Geological Collection has subsequently been transferred to the Oxford University Museum. Mary Hutton initially left her sea urchins to Professor Herbert Hawkins.



"Also 1 Fish tooth + 1 calcareous alga from the Jurassic of Glos."

The influence of the Hutton family, however, did not finish here, for Mrs Hutton arranged for Beatrix to call on Mr Lucey at 11, Camden Square, London to show him her fossils and paintings of fossils. She did so on 9 July 1896. After asking her what she required, he promised to meet her in the NHM and to tell her the names of some of the fossils:

"He seems to think it positively improper to collect fossils all over the country, but I do not feel under any obligation to confine my attention to a particular formation, viz., the various zones of the Inferior Oolite at Stroud, which I visit once a year for ten days. I beg to state I intend to pick up everything I find which is not too heavy."

Since her introduction to the pleasures of fossil hunting by her cousins, Beatrix had already collected at Lennel (trilobites and plants), Salisbury (ammonites) and Denbigh (corals and molluscs) and probably regarded Mr Lucey's view as anachronistic. Cousin Mary on the other hand initially confined her collecting to the Jurassic. Later,



Figure 2. *Astericanthus magnus* (Agassiz), P22047, palatal tooth, M.H. Hutton bequest, April 1987. The locality given: quarry at south end of Huddinknoll Hill, half a mile north of Edge (near Harescombe).

when she had decided to collect mainly Bryozoa and sponges, she extended her collecting to the Cretaceous and Tertiaries.

Beatrix met Mr Lucey at the Museum on July 13th when he pointed out the various fossils: they also met the keeper of Geology, Dr H.B. Woodward, a specialist on the Inferior Oolite. It was presumably he who identified Beatrix's echinoderm as *Arabacia forbesi* and explained that it came from the Lower Trigonian Grit (he also later identified her trilobites).

At this point we will return to June 1894 and Beatrix's introduction to fossil collecting by her cousins. The following month she went with her parents (July 1894) to Lennel, Coldstream, taking with her Ramsay's *Physical Geography of Great Britain* which she studied assiduously. Her diary for the next two months is full of geological observations and she was clearly able to recognise glacial moraine and stranded boulders and her imagination allowed her to pen such descriptions:

"Of the towering resistless ice piled as high as the clouds above me, grinding over the top of the Cheviots, swaying round it as the current sways round a stone under water."

Despite this new interest in physical geology she spent a considerable time fossil hunting:

"July 28th wrote to Caroline. Went out after fossils again, and very nearly got cragged. I did not have any luck to compare with the fishes' teeth a few days since."

She was becoming an avid collector. She searched the shore at Carham without success but on the foreshore at Berwick she picked up a great many fossils. At about this time she acquired a geological map of the Jedburgh area together with an account of the local geology. Perhaps this inspired her, for her diary entry dated October 6th notes:

"I found some interesting fossils, also I have found out which stone to split and how to use a cold chisel."

Then after packing up her fossils at the end of her holiday she wrote;

"The funguses will come up again and the fossils will keep. I hope I may go back again some day when I am an old woman, unless I happen to become a fossil myself which would save trouble. The fatigue and petty annoyance of a removal rather painfully obtrude the advantages enjoyed by disembodied spirits."

As an afterthought she added:

"I made about 40 careful drawings of funguses and collected some interesting fossils one of which I find labelled at the Museum *Araucarioxylon* from Lennel Braes, a lucky find since I know nothing about it".

Although this is the only fossil that Beatrix names in her journal it is unclear which Museum she is referring to. In my estimation she means the NHM, London, since the sentence comes as an afterthought and was probably written after her return to London; moreover, elsewhere in her diary the Museum is always the NHM and there was one specimen on display there labelled *Araucarioxylon* from Lennel Braes.

In October whilst still at Lennel she painted the first of her fossil studies, four indeterminate wood fragments from the Lower Carboniferous of Lennel. A month earlier



Figure 3. *Pitus antiqua* (*Araucarioxylon*) BMNH: OR 52810, Lennel Braes.

she had photographed (A.T.) 2011, what I take to be *Araucarioxylon* (= *Pitus antiqua* Witham). It is worth adding, however, that she had not yet identified it at NHM.<sup>1</sup>

The following year, 1895, the family spent much of April in Weymouth and Salisbury affording Beatrix ample opportunities for fossil hunting. She collected in the Oxford Clay:

“about the consistency of putty,”

and in the Portland Stone of Chalbury Hill where she took pictures of gigantic ammonites (*Titanites giganteus*). She also collected from the Kimmeridge Clay near Osmington and from the quarries near Chesil Bank. She also studied chalk fossils in Salisbury Museum.

After her return to London Beatrix painted her second study of fossils in May 1895. This comprised just two fossils – both of which appear to show the armour of an eurypterid.

Neither fossil is named but the locality given is Lennel, Coldstream (Lower Carboniferous).

At the end of May the family spent a week’s holiday at Denbigh, where Beatrix was able to collect many new fossils including corals, crinoids and molluscs from two large nearby quarries in the Carboniferous Limestone.

<sup>1</sup> The six syntypes of *Pitus antiqua* from Lennel Braes are all in the NHM.

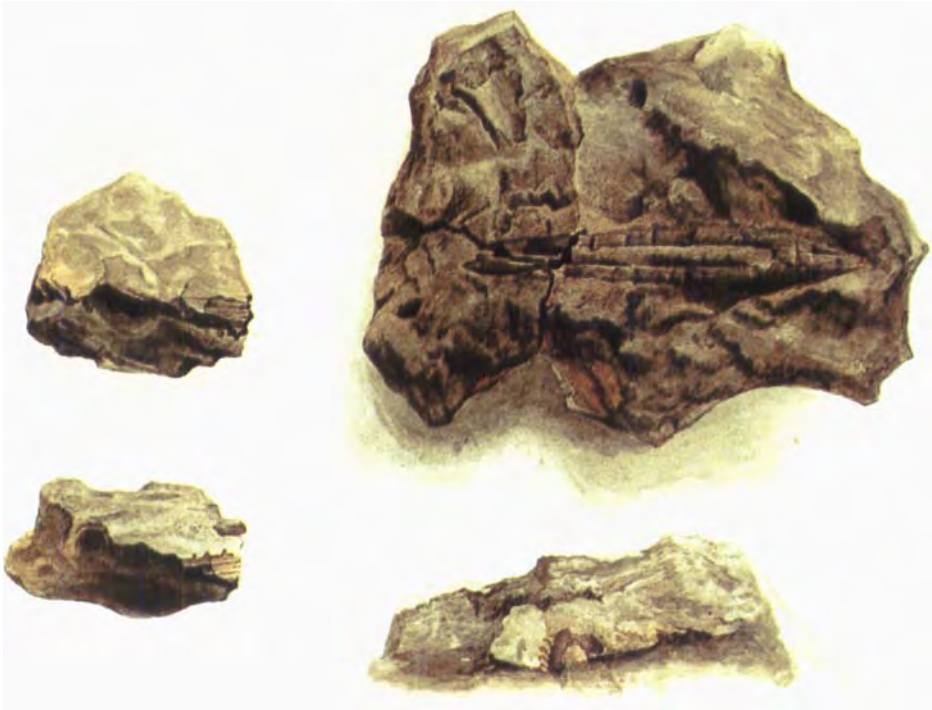


Figure 4. Indeterminate wood fragments from Lennel. Watercolour on paper, October 1894.

Two days later Beatrix travelled alone to Stroud and the Huttons for the second time, where, as I have described above, she collected many more fossils and on her return to London went with Mr Lucey to the NHM.

The Potter's spent their summer holiday (July 26th – September 25th) that year in Windermere. Beatrix records that it was not until ten days later that she drove her pony up Troutbeck for her first great day of fossil hunting. She went again on the following Saturday, August 10th and then on August 15th she visited Sour Howes quarry where she collected very many fossils although:

“I was a little afraid of the quarrymen but they made no remark.”

As a direct consequence of her collecting activity Beatrix produced two studies of Troutbeck fossils both painted whilst in Windermere. The first study of six fossils, from the Applethwaite Beds at Sour Howes, was of trilobites, which she presumably got H.B. Woodward to identify. The second study of eight fossils, also from Sour Howes, comprised a mixture of fossils ranging from a graptolite to corals and a trilobite pygidium. The painting provides precise locality data and was painted between August and September. One fossil, however, a crinoid stem of uncertain age, was painted on November 15th when she was back in London.

As well as collecting fossils Beatrix still had time to observe the effects of glaciation and to photograph roche montones on Elterwater Common, although she was unable to



find ice scratches on the polished boulders. As at Lennel, she pondered the force which had scooped Langdale out of volcanic rocks and estimated it had been carved by the great northern ice flow.

From Windermere she went with her parents to Manchester where she spent an afternoon studying fossils in Owens College Museum (September 25th 1895).

A week later she was back in London studying fossils in the NHM. At the end of the month she was again in the NHM but this time studying insects, while on the afternoon of December 20th:

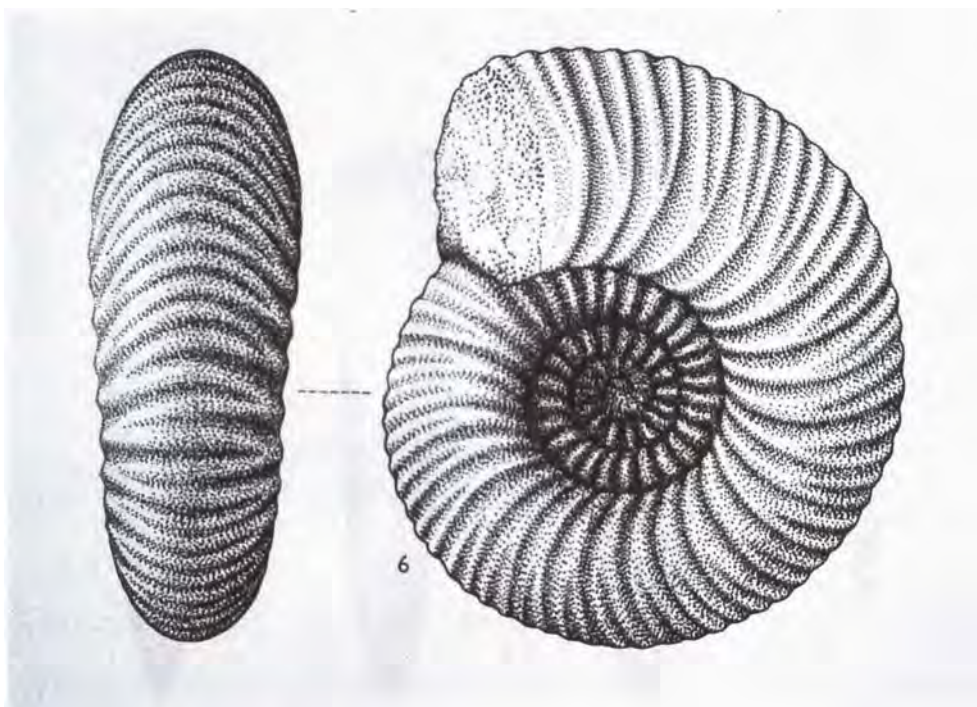


Figure 5. *Titanites giganteus* Portland stone.

“Went to the Museum, very empty and quiet, studied fossils peaceably and afterwards the insects again — I sometimes wonder whether geology names the fossils or the fossils geology.”

Beatrix had been going regularly to the Museum on her own to sketch and identify specimens from about 1895 and had got to know both Dr H.B. Woodward and A.S. Woodward, his successor as Keeper of Geology. H.B. Woodward had two daughters, the eldest of whom was employed by her father to illustrate his papers and thus was a permanent visitor to the Geology Department throughout the 1890s. She befriended Beatrix and often acted as her chaperone when she visited her publisher, Warne.

Beatrix' friendship with Miss Woodward gave her much more freedom of access to the geological collections at the NHM and as late as 1904 she remarks:



Figure 6. Fragments of eurypterid armour. Watercolour on paper, May 1895.

“I have been working very industriously drawing fossils at the Museum, upon the theory that a change of work is the best rest”.

Interestingly, Beatrix also knew the Director of the Museum, Sir William Flower:

“He knows me occasionally but generally not at the Museum”

“Miss Rosalind suggested it was because I had got on a bonnet”.

What Beatrix had failed to realise was that her bonnet was covered in feathers and that early in 1896 Flower had launched his campaign of conservation with the call for the banning of the use of feathers in millinery!

Her diary records the first Sunday Opening of the Museum on May 17th 1896 with her comment

“I always think boys are more mischievous on Sundays. I saw one trying the palms in the botanical department with his finger nails”.



Figure 7. Six fossils from Sour Howes, Troutbeck. watercolour on paper, August 1895. The fossils are all trilobites and comprise: top left *Tretaspis hadelandica*; top right *Acidaspis magnaspina*; mid left calymenid pygidium; mid right ecrinurid pygidium; bottom L and R *Toxochasmops marri*.

On this occasion she avoided shaking hands with the Director and later visited the Stratigraphical Gallery.

Her annual visit to Stroud that year took place in November and it clearly renewed her interest in fossil collection:

“I had some pleasant grubbing in Huddinknoll quarries and triumphantly found a shark’s tooth” (probably *Asteracanthus*).

Over Christmas and the New Year 1897 Beatrix worked on her paper for the Linnean Society ‘On the Germination of the Spores of Agaricinae’ which was read on April 1st



Figure 8. Eight fossils from around Sour Howes Troutbeck. Watercolour on paper August – November 1895.

Top left, monograptid from wall above Thickholme; top right, base of a solitary coral from Sour Howes; mid left and mid centre, a streptelasmatid coral from Sour Howes and Nanny Lane; mid right, a calymenid pygidium also from Nanny Lane; bottom left and centre, more streptelasmatid corals from Nanny Lane and Garbourne Road; bottom right, a crinoid stem from Garbourne Road – added on November 15 1895.

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1897. Then she worked on the painting and identification of the fungi and lichens she had collected during the previous summer.

After a visit to Kew and talking with Mr George Masse about her intended paper, Beatrix commented:

“By the way he told me something rather odd, that fungi went back to the Laurentian. I supposed he meant that contentious object of Sir W. Dawson. I can’t find it at the Museum. I prefer the sagacity of the man in the street.”

This comment shows that Beatrix read the literature, knew that Dawson was in



charge of the Canadian Geological Survey and did not believe Dawson had found the earliest fungi! Then less than a month later (January 28th 1897) Beatrix visited the Museum and called on the Keeper of Geology:



Figure 9. *Eozoon canadense* BMNH P.3736. Côte St. Pierre, Quebec. Laurentian.

“to ask Dr Woodward about the eozoon, Mr Masse having told me there were funguses in the Laurentian. It is a very beautiful green. He is a very pleasant gentleman.”

Clearly Woodward showed Beatrix the specimens which Dawson had collected and which Dawson believed to be the remains of Foraminifera.

Sadly this is one of the last entries in Beatrix Potter’s Journal – and she does not record whether or not she believed Dawson’s specimen was a true fossil or merely an artifact of sedimentation as it has subsequently been shown to be.

Finally in the early 1900s (1904; 1905) the Potters spent several summer holidays in Lyme Regis<sup>1</sup> where Beatrix collected a specimen of *Dapedium granulatum* which was

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<sup>1</sup> There are several of Beatrix’s sketches of Lyme in the local Philpott Museum. She also wrote Pig Robinson in Lyme.

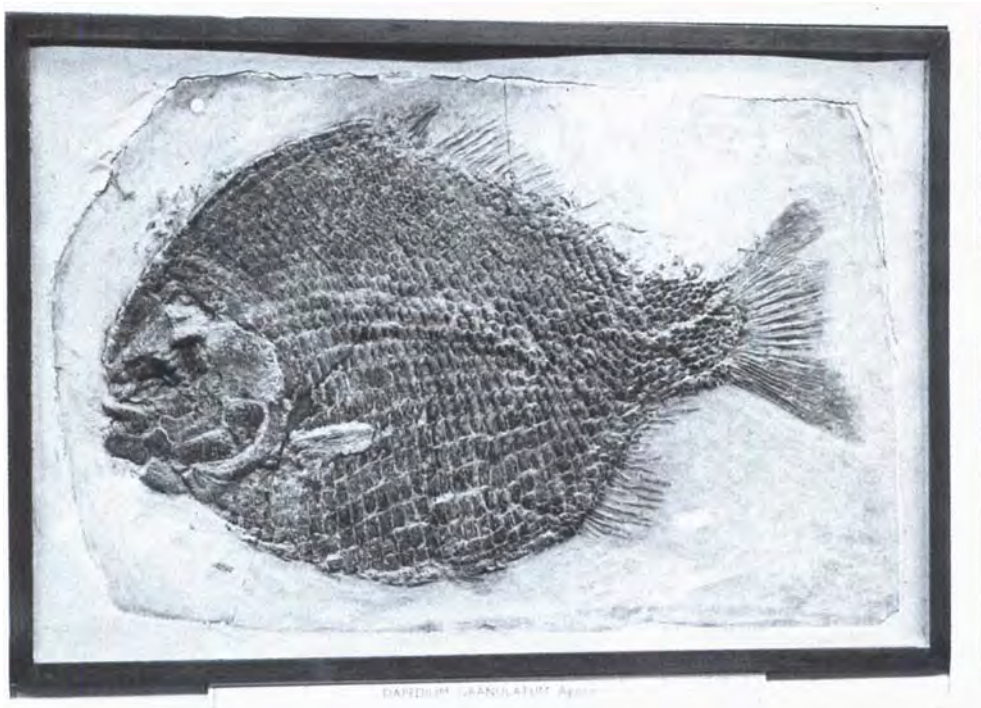


Figure 10 above. *Dapedium granulatum*. BMNH P3563. L. Lias Lyme Regis.  
Figure 10 below. *Dapedium* – restoration by A.S. Woodward.

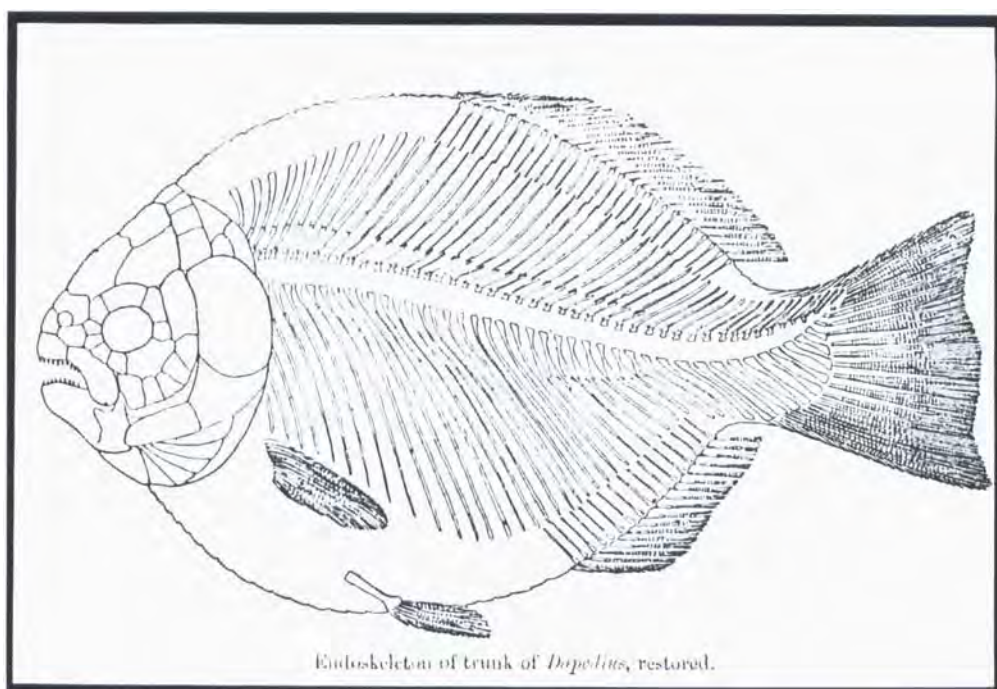




Figure 11. Harescombe Churchyard where Annie Coldrick is buried and whose funeral BP attended.

identified for her by A.S. Woodward. Ironically this is the sister-species of *D. dorsalis* she had collected at Dumbleton in 1895! It is clear that Harescombe Grange and her Hutton cousins had a very considerable influence on Beatrix Potter's life. Her first visit in 1894 not only sparked off her interest in fossils but also caused her to re-examine her attitude to the *Origin of Species* and religion.

She found herself in sympathy with Caroline's outspoken agnosticism and did her best to counter Mary's piety with explanations of the views put forward by Huxley and Darwin.

"I brought tears into her eyes when I spoke about poor Annie Coldrick, the girl they had been so kind to, who is dying of consumption. I suggested that though Huxley was sufficient for an educated person like Caroline, it would be a poor exchange and indeed an impossible creed for the lower classes."

And then later:

"It is not possible to appreciate religion in other people while oneself disbelieving creeds....."

Nevertheless, Beatrix enjoyed the service in Gloucester Cathedral which she had gone to with Caroline. This visit was the result of a story which Caroline had related to her after she had confessed to believing in fairies longer than most and which eventually resulted in her writing *The Tailor of Gloucester*<sup>1</sup>. As well as attending the service Beatrix made sketches of the old streets round the city centre. Finally, on their return to Harescombe Grange she persuaded the coachman's young son to sit cross-legged on the kitchen table (like a tailor) so that she could sketch him.





Figure 12. Sophia Hutton (née Holland)

On various occasions over the next six years Beatrix returned to Harescombe Grange and made more sketches of the streets around Gloucester Cathedral as well as interiors of some of the Cotswold cottages in and around Pitchcombe.

During one such visit she returned to London with two mice which had been caught in a cage-trap in the kitchen at the Grange and which she had rescued from the cook. These she called Tom Thumb and Hunca Munca and they appeared in the spring of 1904 in her book *The Tale of Two Bad Mice*.

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1 22 of the 26 illustrations for the *Tailor of Gloucester* can be viewed in the Tate Gallery.



Figure 13. Scotescuar – the quarry in the Lower Trigon Grit (known locally as Edge Quarry).

Finally in the Autumn of 1912 after she had been proposed to by her future husband (William Heelis) she wrote a despairing letter to her cousin Caroline in which she outlined her parents' displeasure and objections to the intended marriage. Her free-thinking cousin replied immediately with forthright advice – to ignore her parents' wishes and to get married quietly.

In the event her parents withdrew their objections. Beatrix and William got engaged in the Spring and married in the Summer of 1913.

In summary, Beatrix Potter collected fossils assiduously over a 10 year period. She painted a few and drew many others. It is even possible that she drew fossils for H.B.Woodward or at least assisted his daughter to illustrate some of his Palaeontological Society papers. Beatrix also photographed fossils and identified them by reference to the NHM collections. Perhaps she had hoped to emulate cousin Mary and grandmother Holland? Certainly the age of rocks, and their contained fossils, provided her with an intellectual stimulus which was missing from “the rock of ages.”



Figure 14. Mary Hutton

What, however, happened to her fossils? In all probability they were disposed of by her parents, following her marriage in 1913. All that remains is the specimen of *Asteracanthus* in the NHM and possibly *Magnosia* (*Arbacia*) in the Oxford Museum, while there is a photograph of her specimen of *Araucarioxylon* (*Pitus antiqua*) in the Armitt collection.

#### *Acknowledgements*

My grateful thanks to Mrs E. Gabb, Library Manager of the Armitt Library and Museum for copies of the water colours of fossils and to Caroline Hutton for the loan of family photographs. I am also indebted to Frederick Warne and Co. for the picture of Troutbeck fossils.

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B.G. GARDINER

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## **Library**

Revised Library Regulations were agreed at the last meeting of Council on the recommendation of the Library Committee. These will be sent to new Fellows on election and the section on loans will be pasted into future accessions. Both of these versions will be in a type face which should be more legible than the previous version. They differ only slightly from the old regulations and take into account recent changes such as the increasing use of mobile telephones and computers. Fellows should note that books borrowed by letter post will in future be sent by Recorded Delivery service and should be returned using the same service. This should provide a computerised tracking similar to that already available for parcel post. The revised regulations follow here for information:

### **1. Opening hours and facilities**

- 1.1 Monday – Friday 10.00 – 17.00. Closed Saturday and Sunday, public holidays and the day after an English Bank Holiday. The Society is closed from Christmas to New Year.
- 1.2 The Library has a micro-fiche reader and a black and white photocopier but not all material is suitable for copying (see 2.8 below). Non-Fellows must make an appointment when wishing to use the Library to ensure staff will be available. Current Library information and contact numbers are available on the Society's website.

### **2. Conditions of admission and use**

- 2.1 All members of the Society and persons not members of the Society who bring a satisfactory reference or letter of introduction may have access to and use the Library for reference purposes. They must sign the Library Visitors Book on each visit by which they agree to abide by the Library Regulations.
- 2.2 Access to the Library of Linnaeus and to other rare or special material shall be at the discretion of the Librarian or Executive Secretary. Access to *all* manuscripts requires an appointment (see 1.2); many are not accessible at short notice.
- 2.3 The use of pens (ink, ball-point or felt-tip) is forbidden when books and manuscripts are being consulted in the Library. Guidelines on handling books and manuscripts must be followed. Readers should take notes only in soft pencil (available on request). It is forbidden to deface a volume, manuscript, drawing or photograph in any way.
- 2.4 Handbags, luggage or overcoats are not permitted in the Library Reading Room. Entry of laptop computers and similar equipment may be permitted at the Librarian's

discretion. The Society reserves the right to examine all items brought into the Reading Room. The Society accepts no responsibility for the loss of personal items.

- 2.5 No book, paper or other article may be laid on the open pages of any printed volume, manuscript, drawing illustration or photograph. Book rests will be supplied when necessary.
- 2.6 Smoking and the use of mobile phones is not allowed in the Reading Room. Consumption of food and drink is not permitted when consulting library materials.
- 2.7 A reader may consult up to six items at one time.
- 2.8 Any form of reproduction should be agreed beforehand with the Librarian. A decision will depend on its physical condition and copyright status. Permission must be obtained beforehand for any electronic scanning, photography or photocopying.
- 2.9 Access to the upper galleries of the Library by readers is not permitted except in exceptional circumstances, with permission of the Librarian and at the Reader's own risk.

### 3. Loans

- 3.1 Most books may be borrowed by Fellows or Associates who must be resident for the time being in the British Isles; also by the British Library, the Natural History Museum and other recognised institutions and by the Libraries of any of the other Societies having apartments in Burlington House (for loan to their Fellows).
- 3.2 Books will be issued to messengers or sent by post only on the written authority of a member (this can include electronic mail or facsimile requests)
- 3.3 Books belonging to the Library of Linnaeus and certain reference books may not be borrowed. Annotated or specially valuable books, manuscripts and drawings which it would be difficult to replace in case of loss, may not be borrowed without the special sanction of the Library Committee and Council.
- 3.4 Not more than six volumes will be lent to one person at the same time.
- 3.5 One month is allowed for each volume; *an extension may be granted upon application if the volume is not required by another person.* Borrowers retaining books longer than the time specified or neglecting to return them when requested shall forfeit the right to borrow books from the Library until the volume(s) so retained be returned. The right to borrow ceases if a member withdraws from Fellowship.
- 3.6 Books can be borrowed by post using the Recorded Delivery service both ways. Carriage and all other expenses incurred from the time of the issue of the book to its return to the Library must be paid by the borrower. ALL BOOKS RETURNED BY POST MUST BE ADEQUATELY PACKED AND PROTECTED. In the event of loss or damage the cost of replacement or repair must be borne by the borrower. When necessary the Society may insist on adequate insurance cover being provided by the borrower.
- 3.7 On returning a book to the Library, a cancelled loan slip must be claimed as evidence of return (a book returned by post will be acknowledged by return of



cancelled loan slip to the borrower). Any books delivered by hand must be delivered to a member of the Society's staff

- 3.8 New acquisitions are not available for loan until the expiry of one month from their being placed on display.

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The accumulation of books for cataloguing has gone down slightly but is likely to rise with useful "gap-fillers" being brought in among contributions to the November Book Sale. Fellows may be interested to know that this raised £321.52 towards the Library funds. Material left after the sale is sorted into books to be sold to antiquarian or specialist book sellers, academic items suitable for disposal through the Booknet service of British Library, popular novels which go to charity shops, review copies for donation to institutional libraries and a small residue to carry forward to the next sale. Almost nothing is thrown away: our aim is to find a home for everything. Fellows often ask for advice on disposal of back runs of journals and, although our storage space here is restricted, we do try to accept runs of the Society's journals as these can be used to make up sets for Institutions requesting back runs. We do need to be contacted beforehand to make sure staff are available to move your boxes or bundles. We do not generally accept journals from other societies due to lack of room. Sometimes, however, we are glad to have them to make up our own deficiencies where the Society has stopped subscribing or journals have been damaged or lost.

#### *Donations*

Books received from the estate of the late B.E. Smythies still remain to be listed, as do some recent accessions from Book sale donations. Most of the following donations were received during September and October 1999, a few were missed on earlier listings. We are most grateful for all who give us books, journals or copies of their reprints for the Library. Sometimes books arrive when I am not there to receive them and get listed under the wrong donor or mixed up with other incoming mail. Please let me know if your gift has been listed as from someone else or not listed at all and we will correct the record: our catalogue entries carry a permanent record of your donation and future generations may be searching electronically to see what books came from you in the same way as they do now for books from A.R. Wallace or Charles Darwin.

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## Book Review

**Life Out of Bounds: bioinvasion in a borderless world** by Chris Bright, publ. Earthscan, 1999, 256pp. Volume No.10 in the Worldwatch Environment Alert Series. P/B ISBN 1-853-835919 Price £12.95.

Bioinvasion – the spread of alien plant and animal organisms and pathogens around the world, either naturally or with the deliberate or unwitting assistance of man – is a growing phenomenon, and until relatively recently has been largely unrecorded and ignored. The continental increase in trade and travel to all parts of the globe encourages the dispersal of more and more invasives that put native species at increasing risk.

In this book, the author outlines the extent of, and dangers from, bioinvasion, which, worldwide is now only exceeded by loss of habitat in its potential to damage irreparably native ecosystems, and on oceanic islands is in many cases the primary cause of such destruction. Bright describes the escalating threats to the foundations of biological diversity and productivity and their sources, and explains why they should be of concern to us all: he shows how the addition of an exotic species to a native biota tends to reduce that area's biodiversity, and that biological invasions are not only laying waste entire ecosystems but are also endangering the health of human populations, disrupting the economy and culture of native peoples, and adding an immense annual expenditure to the global economy.

Over the long term, the present rate of biological invasion is no more sustainable than is the current rate of tropical rain-forest destruction or greenhouse gas emissions. Yet the world already possesses the knowledge and methodology required to resist, or in some cases even reverse, the consequences of bioinvasions; only the will is, apparently, lacking. The author outlines the steps that need to be taken to address the problem, ranging from international codes of conduct to in-the-field control techniques. Appreciating that the principal challenge may be cultural rather than technical, he calls for a higher degree of ecological awareness, whereby the importance of indigenous species of plants and animals is realised.

Chris Bright sets out to develop a global perspective on bioinvasion as a form of ecological damage and as a cultural, economic and epidemiological problem; his book, which is designed to awaken the awareness of a wide spectrum of readers, including policymakers, politicians, biologists, university students, people in professions allied to the problem, and the generally interested layman, is written in an uncomplicated style that makes the various issues easy to grasp. My only criticisms are that the end notes are sometimes less than easy to follow, and the references are not listed alphabetically. These minor cavils apart, however, this is the best and most intelligible introduction to the subject that I have read for a long time.

CHRISTOPHER LEVER

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